TECHNOLOGY DEPARTMENT

TELEPHONE ENGINEER and MANAGEMENT

PUBLIC LIBRARY
DETROIT

FEBRUARY, 1948

WASHINGTON, MISSOURI

AT the request of a friend, Henry J. Tibbe fashioned a pipe from a corn cob in his little wood working shop back in 1869.

This seemingly insignificant act was the start of the present corn cob pipe industry in Washington which now produces over 14,000,000 of these pipes annually.

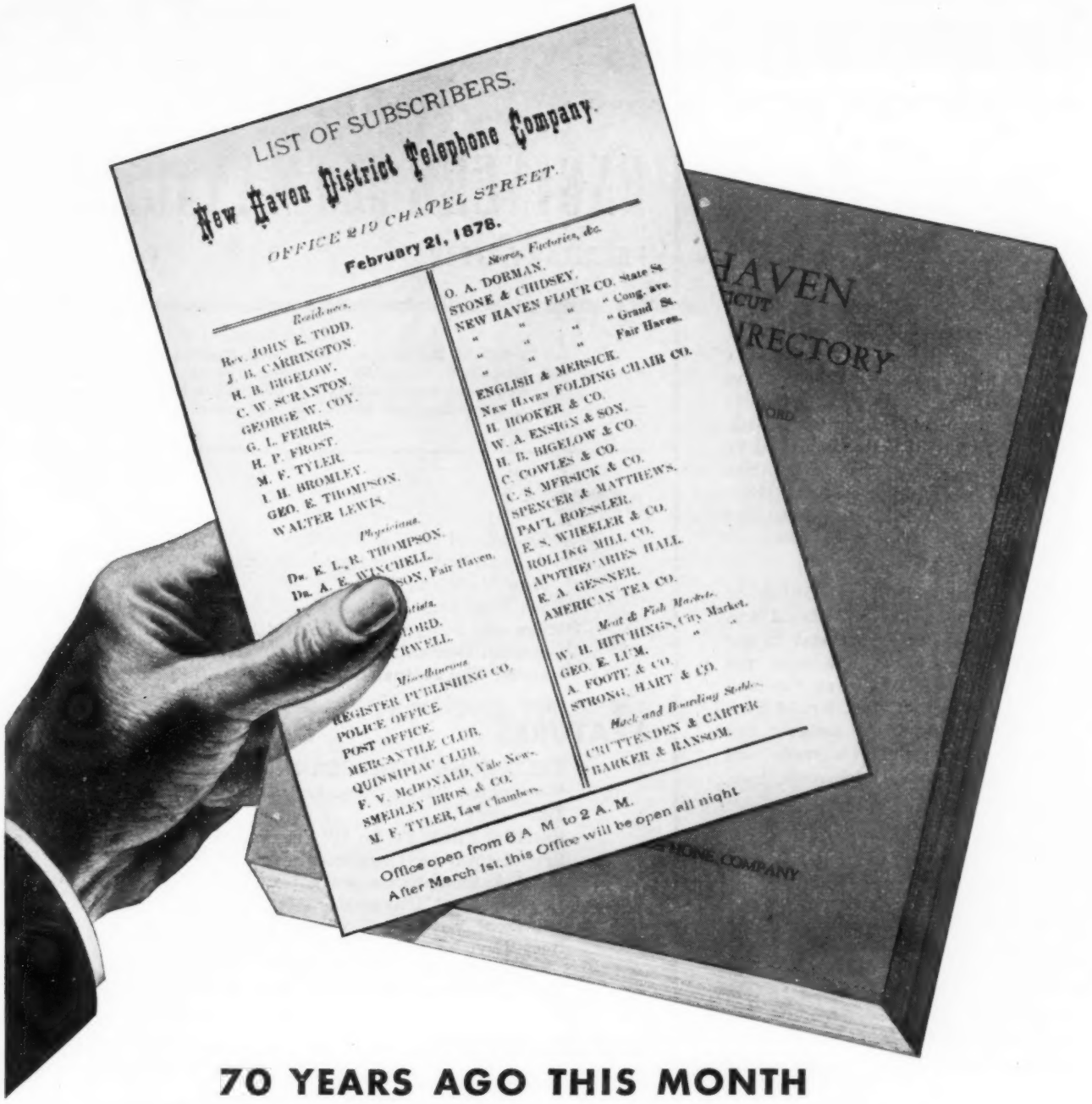
In addition to being the home of the corn cob pipe, Washington is the site of two large shoe manufacturing companies and 10 other concerns whose products range from lingerie to hand trucks. The 1900 workers employed by these firms take home paychecks amounting to over $3 million a year.

This month telephone subscribers in the Washington area will receive a brand new telephone directory. This new directory is the first one published under the recent agreement between the Ozark Central Telephone Company, which serves the Washington area, and General Telephone Directory Company. *The Ozark Central Telephone Company has just begun to enjoy the many advantages that the Telephone Companies in the More Than 1000 Cities and Towns for which we publish telephone directories have had for a number of years.*

If your directory publishing procedure is not entirely satisfactory, we would like the opportunity to submit one of our Complete Service Plans for your consideration.

General Telephone Directory Company

Eastern Office: 185 North Wabash Avenue, Chicago 1, Illinois • Telephone State 5478
Western Office: Press Telegram Building, Long Beach 12, California • Telephone 6-7221



70 YEARS AGO THIS MONTH

the first telephone directory was issued

On February 21, 1878, one month after the opening of the first exchange, 50 telephone users received a "List of Subscribers" from the New Haven District Telephone Company. This was the first published directory . . . also the first classified one. Some of the names appearing on this single sheet of 70 years ago, are still listed in the New Haven Directory.

Today, close to 40,000,000 directories are distributed each year. They come in all sizes, from two-page cards to the 2000-page Chicago book, the largest single volume telephone directory in the United States. And they cost the industry many millions of dollars yearly. But directory publishing is a vital part of telephone service, and it is performed with the same faithfulness and dependability that are characteristic of all departments of the telephone industry.

Exide Batteries provide the same dependability for which telephone service is famous throughout the world. Since 1895, Exide Batteries have been proving themselves worthy of that trust.

Exide
BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto

IT SEEMS TO US

Friends of P. M. "PETE" FERGUSON, Mankato, Minnesota, will be glad to hear he is in good health again after several weeks of serious illness. We enjoyed seeing him at the St. Paul convention last fortnight when we attended the annual party TOM MACOUBRAY, another good Scot, had for his friends at the St. Paul Athletic Club. And as usual, the 1948 party was better than ever before. It is traditional that Pete serve as Master of Ceremonies for Tom's fine party.

• • •

ELLEN and DORY NEALE of Topeka, Kansas, are a husband and wife team that is exceptional in our industry. Ellen owns and runs the Cable Spinning Equipment Co. and Dory is owner of the Neale Construction Co. He is the designer and inventor of the products made and sold by wife Ellen. In his work, handling construction for telephone companies on contract, husband Dory operates throughout the U. S.

• • •

C. T. WESTON, head man at the Port Byron (N. Y.) Telephone Company, has again been re-elected president of the Port Byron Chamber of Commerce. He is one of many in Independent telephone circles that have been drafted into civic work by fellow citizens.

• • •

LEON ROBERTS, of the Gary Group Companies, Chicago, holds the unique record of being the most regular and attentive listener to convention programs of anyone we know, excepting of course those of us of the telephone trade press(?). We publicly acclaim him for the assistance he has given us in reporting many of the conventions when we are out of sessions. His training as a newspaper man makes him a fount of information regarding activities of Independent people throughout the country.

• • •

The Winemiller family, PERRY, JACK and MIN, of Dallas, Tex., has asked us to thank the many, many friends of the family for their expressions of condolence on the death of their beloved PETE WINEMILLER.

The National Telephone Magazine

TELEPHONE ENGINEER and MANAGEMENT

FEBRUARY, 1948 **VOL. 52, NUMBER 2**

Editor, RAY W. SMITH • *Advertising Director,* ROY F. SMITH
Managing Editor, JOHN G. REYNOLDS • *Promotion Manager,* DON C. SORENSON
Washington Bureau, ROLAND C. DAVIES *and* FRED HENCK
Circulation Mgr., BERNADINE STEPHENS • *Production Mgr.,* MARGARET INDIA

ARTICLES

Editorial—"People and Dollars"		25
A Micro-Wave Relay System Between New York and Boston	A. L. Durkee	28
Open Wire Terminations	John S. Reed	31
Minnesota Independents Hold 39th Annual Convention	Ray W. Smith	34
Helping The Mutual Company		43

FEATURES

TELEPHONE ENGINEER Newsletter		9
Washington Bureau Reports	Roland Davies, Fred Henck	26
Tele-Views		30
Practical "How To Do It" Suggestions	Myrle Shafer	38
Free Literature Department		42
Court & Commission Activities		46
Line and Desk Discussions	John S. Reed	57
Telephone Engineer Handbook Tables		61
Book Reviews		66
Advances In The Industry	Myrle Shafer	70
The Back of The Book	John G. Reynolds	86

DEPARTMENTS

It Seems To Us	4
The Open Forum	6
Tele-Quotes	12
Suppliers News Briefs	76
New Products' Showcase	78
Classified Advertising	82
Advertisers' Index	86

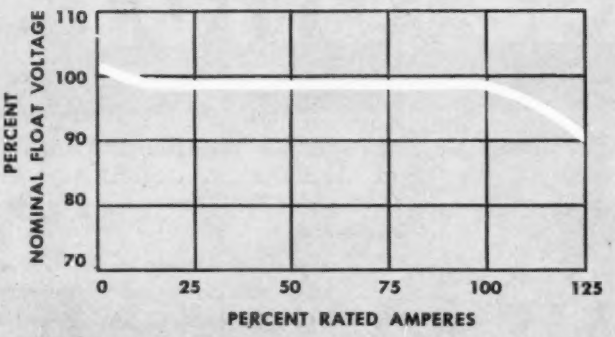
COVER: Tiny diamond chips, bombarded with a beam of electrons have been found to yield electric currents as much as several hundred times as large as the original beam in pioneer experiments at Bell Telephone Laboratories. Dr. A. J. Ahearn is shown placing the mounted diamond chips in a test circuit to check their induced conductivity under alpha particle bombardment, an associated phase of the research.

Published monthly by TELEPHONE ENGINEER Publishing Corporation
7720 Sheridan Road - Phone Rogers Park 3040 - Chicago 26, Illinois
West Coast Representatives, BRAND & BRAND
1052 West 6th Street, Los Angeles, California
Copyright 1948 by Telephone Engineer Publ. Corp.

VOLUME 52, NUMBER 2. Published monthly by Telephone Engineer Publishing Corporation. Office of Publication, Pontiac, Illinois. Executive and Editorial Office, 7720 Sheridan Road, Chicago, Illinois. Subscriptions: U. S., Cuba, Mexico, $2.00 per year; Canada $2.50; in all other countries, $4.00. Single copies, U.S.A. 20 cents. Entered as second class matter at the post office at Pontiac, Illinois, under the act of March 3, 1879.

BATTERY-CHARGER FUNDAMENTALS—

how constant voltage improves voice transmission



Typical Voltage Regulation Curve of the E. P. Diverter-Pole Motor-Generator

To assure satisfactory voice transmission, the Battery Charger must maintain the output voltage of the battery as close as possible to a constant value. Transmitters may become noisy if they are subjected to an excessively high voltage, and may have to be replaced because of permanent damage.

The E. P. Diverter-Pole Battery Charger maintains inherently constant d-c voltage . . . regardless of fluctuations in the a-c power supply. Delicate, separately-mounted regulating devices are not required. The E. P. Charger provides a safe, continuous floating charge to the battery. In addition, it is so designed electrically and mechanically that user after user has gone on record that it is exceptionally quiet in operation and creates no objectionable electrical noise.

why EP motor-generators are best . . .

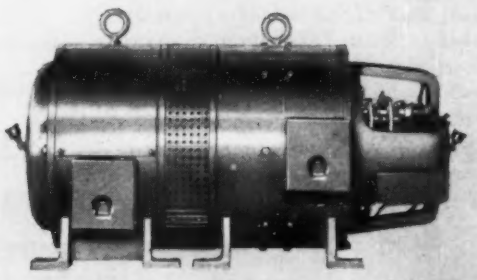
Since 1923, Diverter-Pole Motor-Generators have proved to be the most reliable, maintenance-free and efficient source of direct current for Telephone Exchanges. The characteristics of E. P. Diverter-Poles are ideal not only for the most satisfactory floating charge (a full floating charge is now the accepted standard), but also for carrying the major portion of the exchange load better than any other source of direct current.

The main reason for this superiority is that The Electric Products Company is a specialty manufacturer. For every exchange battery-charging application, E. P. designs and builds an individual Motor-Generator that fits exactly the requirements of the particular operation.

The result is Proved Performance as evidenced by the unequalled long-life records established by Diverter-Poles throughout the Telephone Industry.

For complete details . . .

ASK FOR BULLETIN 209



E. P. DIVERTER-POLE BATTERY CHARGERS

- Are completely automatic
- Control exchange voltage well within high-low limits at all times
- Lengthen battery life
- Are self-protecting against dangerous overloads
- Will not "run away" or reverse polarity

EP X-30

THE ELECTRIC PRODUCTS COMPANY

1729 CLARKSTONE ROAD CLEVELAND 12, OHIO

Crapo

Galvanized Steel* CABLE LASHING WIRE

AVAILABLE FOR PROMPT DELIVERY!

The new *Crapo* Galvanized Steel Lashing Wire (.091-inch diameter) now is available for almost immediate delivery. This improved wire has been developed especially for use with modern cable-spinning machines. It is manufactured from selected steel, carefully processed and heavily galvanized to conform, in every respect, to specifications approved by leading telephone engineers.

Crapo Galvanized Steel Cable Lashing Wire comes in neat, compact, thread-lay coils containing approximately 325 feet. Packed in cartons of 6 coils each.

Ask your Jobber or write direct!

*Crapo Cable Lashing Wire also is available in "Stainless Steel," .065-inch and .045-inch diameter.

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

The Open Forum

Coming To You March 15 . . .

Dear Sir:

I receive copies of TELEPHONE ENGINEER and MANAGEMENT but I would like to get a copy of The Telephone Buyers Guide. What steps are required to receive a copy?

J. M. Langston

New Lothrop, Michigan

Copy of THE TELEPHONE BUYER'S DIRECTORY will be mailed to all subscribers as Section II of the March issue of Telephone Engineer & Management.—Ed.

◆

Trouble Locator . . .

Dear Sir:

I would like to have some information as to how to use an ohm-meter to find trouble on telephone lines. If you could give some information on the uses of the ohm-meter it would sure help me. I have some metallic lines and some are grounded.

Cleo Davis

Frankfort, Ind.

We have just looked over the reply our technical department is forwarding to you, and know that you will soon be able to put your ohm-meter to good use.—Ed.

◆

Permission Granted . . .

Dear Sir:

On page 27 of your January 1, 1948, issue is a photograph of the Great Lakes Station used in contacting ships, which shows a unique application of meters.

Apparently these meters, or at least most of them are Tripletts and we would like to feature the photo in a forthcoming issue of our employe house organ, if you are willing to lend them to us until a cut can be made.

A. R. Baker

Advertising Manager,
The Triplett Electrical Instrument Co.
Bluffton, Ohio

The photo has been forwarded. We are glad to make it available for your use.—Ed.

Drop Wire Article Pleases . . .

Dear Sir:

I would appreciate it very much if you would let me know whether or not I could secure from you 25 copies of Page 74 as shown in your December, 1947 issue of TELEPHONE ENGINEER AND MANAGEMENT concerning drop wire installation.

We are about to inaugurate this type of drop wire installation in our system, and the illustration shown on page 74 would assist our installers better than words.

A. F. Pearson

Plant Engineer,
Commonwealth Telephone Company,
Forty Fort, Pa.

Luckily we had 25 copies of Page 74 left. This particular section on drop wire installation hit home with many companies and we are glad our presentation pleased so many of our readers.—Ed.

◆

We'll Do Our Best . . .

Dear Sirs:

Enjoy and look forward to next issues of magazine.

Would like to see more news of Commission rulings & hearings, especially Michigan.

Jack Hedglin

Holland, Mich.

We've already put a "burr" under the pen of our Michigan scribe. If the burr works we'll have more commission news from Michigan.—Ed.

◆

A Treat for March 15 . . .

Dear Sir:

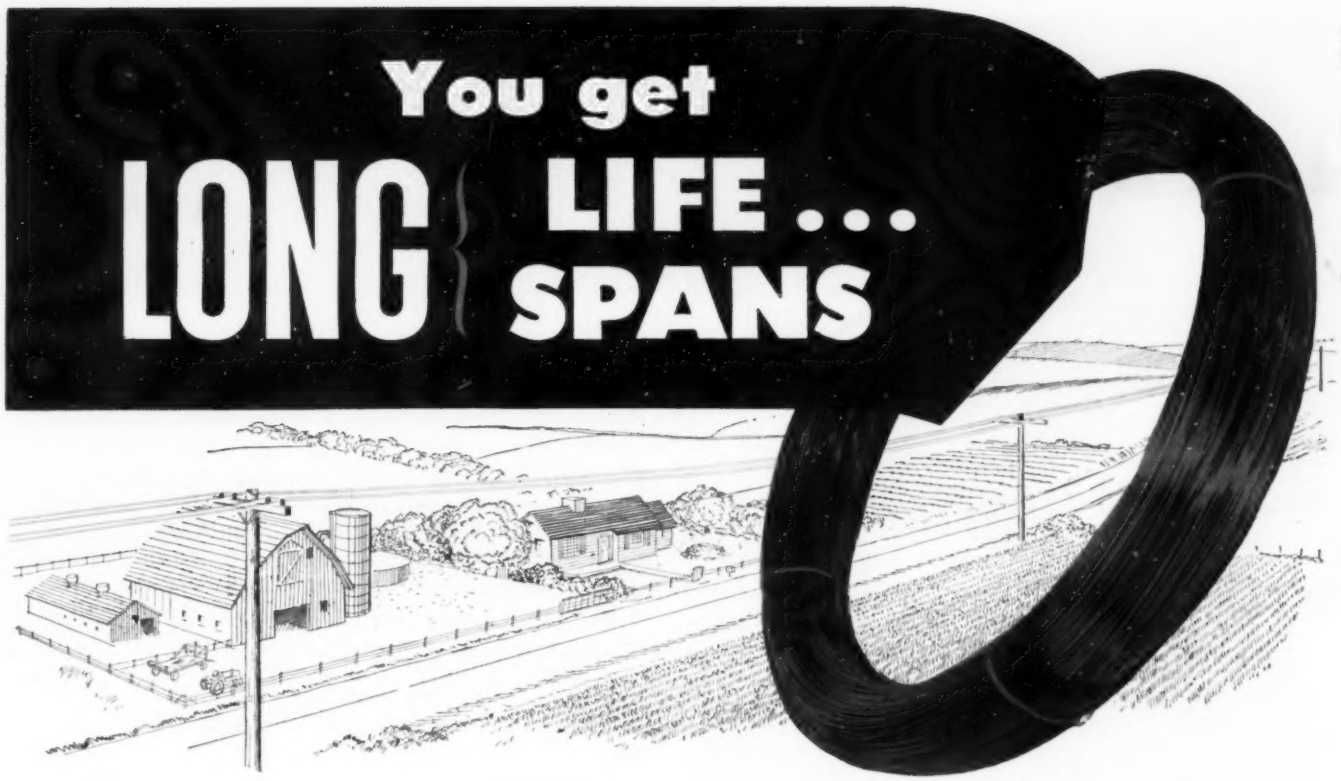
In your publication you have a note to the effect that you have a telephone Buyers Directory which is free to subscribers of your magazine. We are wondering if we could have one or two of these directories mailed to us.

Lucy R. Sheridan

Rochester Telephone Corp.,
Rochester, N. Y.

The Telephone Buyers Directory will be off the press March 15 and will be mailed to all subscribers of TELEPHONE ENGINEER AND MANAGEMENT.—Ed.

You get LONG LIFE... SPANS



...when it's Copperweld Line Wire

With its long-lasting qualities, Copperweld Line Wire definitely meets the requirements of today's trend toward low-cost, reliable, long-span construction. Made by molten-welding a thick, protective covering of copper to an alloy steel core, Copperweld combines the electrical and mechanical properties of these two metals and provides a conductor having advantages which are not obtained in any other line wire:

1. **Safety for long-span construction**
2. **Strength to withstand heavy ice and wind loads**
3. **Protection against corrosion**
4. **Best electrical conductance of any high-strength conductor**
5. **Excellent transmission characteristics for voice and high frequency currents**
6. **Ease of handling because of its pliability**
7. **Low annual cost through long, trouble-free service**

Our Telephone Data Book will give you complete details. Send for your copy today.

GRIP-FLEX 38 TIES

Simple in design and easy to apply. This high-strength tie assures uniformity in construction. It eliminates the more common faults of hand-wrapped ties, which have resulted in chafing and fatigue fracturing of conductors. Available for line wire sizes No. 12 AWG to No. 4 AWG.

COPPERWELD STEEL COMPANY
Glassport, Pa.
SALES OFFICES IN PRINCIPAL CITIES

Copperweld HIGH-STRENGTH NON-RUSTING Line Wire

SOLD BY LEADING DISTRIBUTORS

SPECIAL TRUCK BODIES

~are standard with us

Type B-4—features 4-man crew compartment in body . . . used by power, light, and communications utilities.

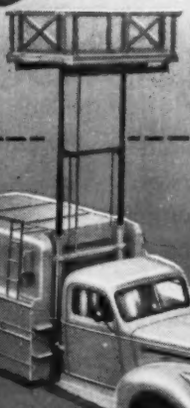
We build utility truck bodies on an assembly line basis. In this field, we are the largest exclusive manufacturers of standard utilities equipment for motor vehicles.

The American line includes several different types of bodies — line construction, light line service, general service and meter installation, utility, crew compartment, maintenance, installation, signal lighting maintenance, street lighting, and others.

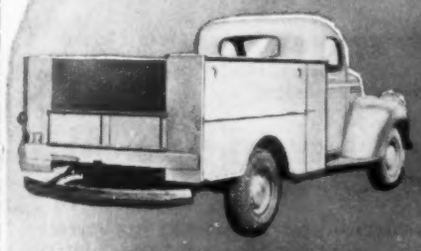
If you have an idea on bodies for your particular fleet, chances are we already have a body for your requirements, or with a few minor changes in one of our bodies can give you what you need — on a production basis.

We can serve you with what you need to help you serve others.

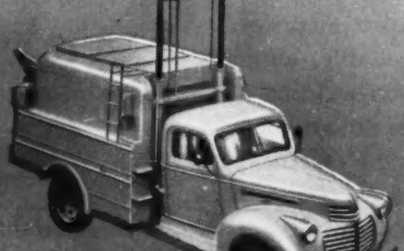
Type DPL and DT Line Construction bodies are the standard design for power, light, and communicating utilities.

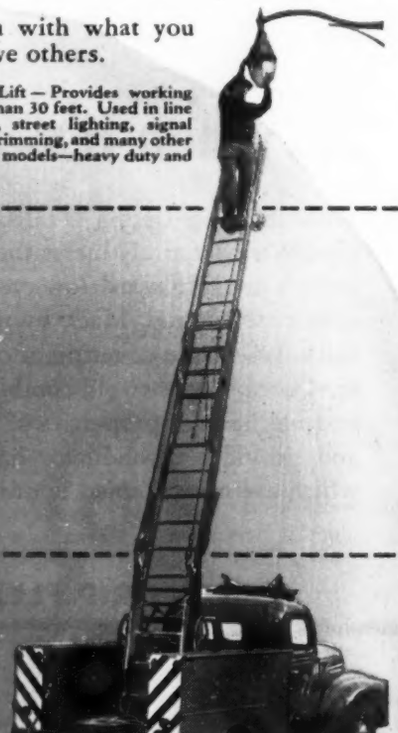


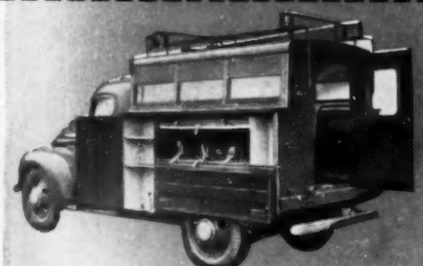
American Tower Lift — Provides working heights of better than 30 feet. Used in line construction work, street lighting, signal maintenance, tree trimming, and many other types of work. Two models—heavy duty and light duty.



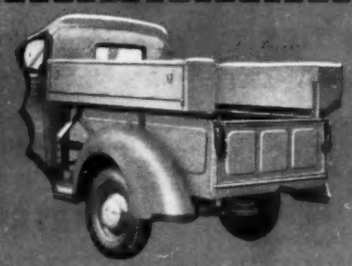
Type 4460—Universal for all types of service work—electric, gas, etc., appliances, meters, plumbers, etc.







Surveyor—An example of an American specialized body. The Surveyor is used for carrying surveying crews and equipment.



Type 4804—Ready-made, lock tight compartments provide generous carrying space for tools and diversified equipment items.

American Revolving Aerial Ladder—American also makes the Seagrave revolving ladder, either manually or hydraulically operated.

ACB and

THE American COACH and BODY COMPANY

9503 WOODLAND AVE., CLEVELAND 4, OHIO

SALES and ASSEMBLY THE AMERICAN COACH AND BODY CO. OF CALIF., 432 FIFTH ST., OAKLAND 7, CALIF. BAKER EQUIPMENT ENGINEERING CO., SUMMIT & NORFOLK STS., RICHMOND 11, VA.

OFFICES 350 MADISON AVE., NEW YORK 17, N. Y. INSURANCE EXCHANGE BLDG., DES MOINES 9, IOWA

NEWSLETTER
TELEPHONE ENGINEER

Fortnightly TELEPHONE ENGINEER ★ TELEPHONE ENGINEER AND *Management*

ON THE 1st OF EACH MONTH ON THE 15th OF EACH MONTH

NEWSLETTERS *on Alternate Weeks*

February 15, 1948

Dear Sir:

Three-cornered controversy has developed in Georgia over how much Southern Bell T. & T. Co. is to be permitted to increase its rates. Southern Bell wants to adjust both local and toll rates an average of 17% to yield additional $3,715,000 of revenue annually. Georgia Public Service Commission, however, refuses to permit full increase asked; says company's schedules would yield it $4,060,000 additional revenue, not the $3,715,000 claimed. Commission ordered rate adjustment to give company additional $1,412,000 a yr.

Meanwhile Judge Bond Almand of Fulton County Superior Court ordered into effect full amount Southern Bell asked for local rates, postponed higher toll rates in granting company's request for temporary injunction against commission's order. Commission immediately filed motion to dissolve Judge Almand's order; court refused to dissolve its order, but agreed to postpone application of hike to toll rates.

* * *

In special 4-page Employees' Bulletin, Rochester (N. Y.) Tel. Corp. presented straight facts regarding its recent application for increased rates. Bulletin provided employees with figures on income, expenses & profits. Concise information will enable every employee to relate to friends his knowledge of company's problem. Public, bulletin says, likes true facts: Comment from well-informed employee often can do more than full page newspaper ad to show customer company is operating under trying conditions.

* * *

Wall Street Journal on Jan. 29 took long editorial look at communications industry; decided that old job of transporting words quickly and accurately is getting new answers. Journal stated some answers have moved out of laboratories. In development stage, they feature; super poles, fungus proof & less tasty to termites; cross-country toll dialing.

* * *

New Western Union service makes it possible to telephone telegrams from moving train. Arrangement enables passenger to ask train attendant to get Western Union on telephone. When connection is made, passenger dictates his telegram; pays telephone and telegraph charges to railroad attendant.

* * *

Further support for repeal of war increases in federal excise taxes on communications & transportation because they are levies of "a nuisance type" was contained in report of United States Chamber of Commerce Committee on Federal Finance, made public Jan. 29.

Report strongly advocated sufficient reduction in proposed $40 billion federal budget as key for tax reduction - recommended early & thorough revision of federal revenue laws.

* * *

Col. H. W. Hubenthal, sec. Oklahoma Tel. Assn., dug into subject of switching rates; came up with valuable exhibit used in hearing involving Lookeba (Okla.) Tel. Co. Company is seeking to boost switching rates from 50c to $1.00 per month. Col. Hubenthal's exhibit and testimony showed cost of switching calls to be $1.01 before interest & depreciation. With last 2 charges added, cost rises to $1.16. Time test at swbd. indicated 406 seconds required to handle 28 local calls (14.5 seconds per call), and 946 seconds to handle 20 rural calls (47.3 seconds per call).

* * *

Walter C. Hasselhorn, pres. of Cook Electric Co. which during last year has been intensifying its research & laboratory activities, was awarded patent recently by U. S. Patent Office for invention of improved airplane de-icer which is credited with potentialities of preventing ice formations on propellors, wings, carburetors, windshields etc., with most efficient & safest method yet developed. The patent (No. 2,435,005) was assigned by Mr. Hasselhorn to Cook Electric Co.

* * *

Highlights: Joe Beran, new owner Clements (Minn.) Tel. Co., plans to install automatic system....Wilcox (Neb.) Tel. Co. filed notice of dissolution....C. M. Bolling appointed mgr. Harrisonville Tel. Co., Waterloo, Ill....Wood County Tel. Co., Wisconsin Rapids, Wis., authorized to issue $9,150 common stock; plans expansion-improvement program....Newly organized Orland (S.D.) Tel. Co. to purchase Orland Tel. Co....Varna, Ill., exchange of Illinois Commercial Tel. Co. destroyed by fire....Crossville (Ill.) Tel. Co. stockholders voted to sell properties; claims present $1 per month rate too low to permit improvements.

Iowa T. & T. Co. converted Worthington, Ia., exchange to automatic operation....Four page editorial section of Mayville (N. Y.) Sentinel, Jan. 22, devoted entirely to description of Mayville Tel. Co. and recent cutover to automatic operation....West Freedom (Wis.) Tel. Co. seeking permission to abandon lines.... George B. Arnos named eastern dist. mgr. Interstate Tel. Co., Coeur d'Alene, Idaho....D. B. Hill, former dist. mgr., Central Tel. Co., Carlinville, Ill., joined National Trail Co., Altamount, Ill., as construction supt.

Tyler (Minn.) Tel. Co. to install common battery service; plan underground cable project....Alden Knapp, son of Harold F. Knapp, became gen. mgr. Sanger (Calif.) Tel. Co....Lerdal (Minn.) Tel. Co. to convert to automatic service....Number of out-of-state visitors are expected at Texas Tel. Assn. convention, scheduled for Buccaneer Hotel Galveston, March 15-16-17. Sec. Jack Haley handling arrangement to make conventioners visit to historic, romantic Galveston Island one to remember.

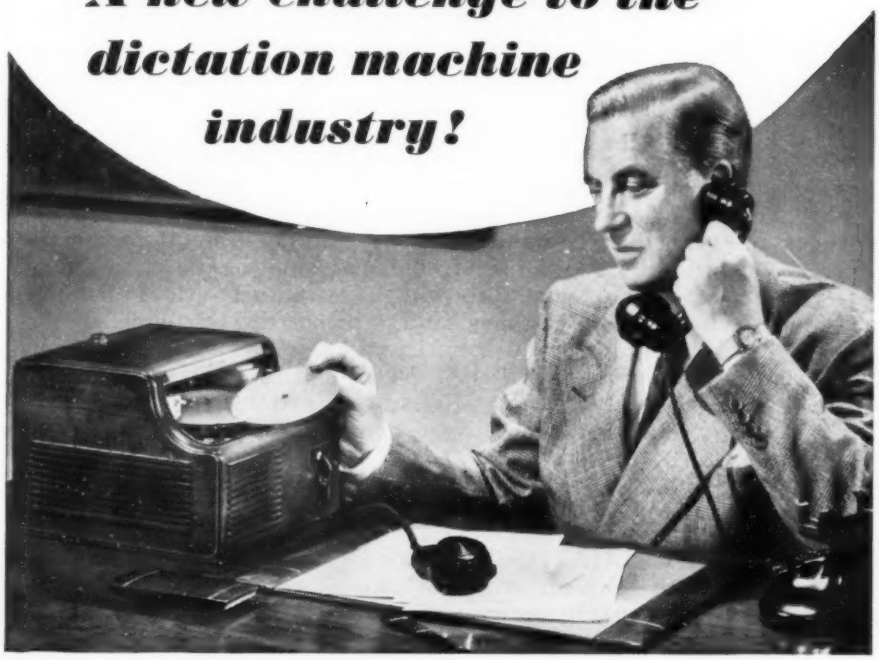
Ray Smith

Ray W. Smith, Editor

The Telephone . . .

now more important than ever!

A new challenge to the dictation machine industry!



THE final order of the Federal Communications Commission authorizing the recording of telephone conversations will open a new chapter in the history of the telephone in business communications. It suggests to the subscriber many new and important uses for the telephone. It also imposes a great responsibility upon manufacturers of equipment capable of recording telephone conversations.

This is a responsibility which The SoundScriber Corporation is in a unique position to assume. Telephone recordings will require instruments and a system capable of the same dependable quality of performance as the telephone itself. SoundScriber is pre-eminently qualified by experience and performance to fulfill this obligation. Prior to the war, SoundScriber introduced an improved system of mechanical dictation . . . setting new standards of clarity, simplified operation and performance.

SoundScriber Engineers, closely collaborating with the industry and the communications branches of the Armed Services during the war, adapted these principles to provide a superior means of permanently recording telephone conversations. The wafer-thin, Vinylite disc employs an embossed sound groove which records and reproduces telephone conversations with unequaled clarity. It offers additional advantages of convenient play-back, routing, and filing of typed transcriptions. The benefits of SoundScriber precision indexing are not available in any other system.

SoundScriber Engineers and Technicians welcome the opportunity to place their broad experience, their resources, at the disposition of telephone companies with the mutual end-view of *service*. More and better service to the American public will naturally follow.

Lucius F. Thompson

PRESIDENT

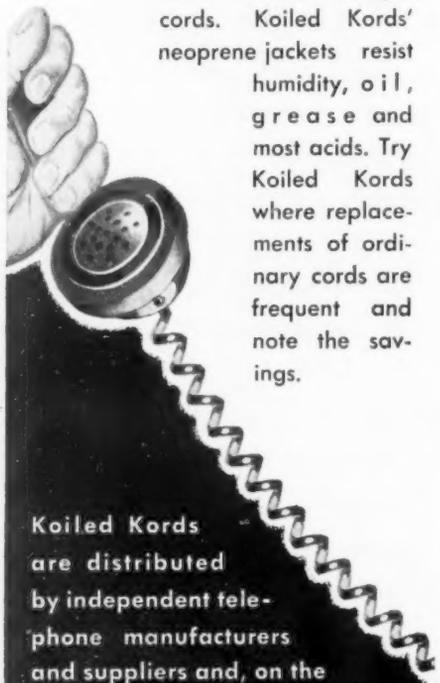
The SoundScriber Corporation

New Haven, Connecticut

NOW TINSEL CONDUCTORS

are used in KOILED KORDS for telephones

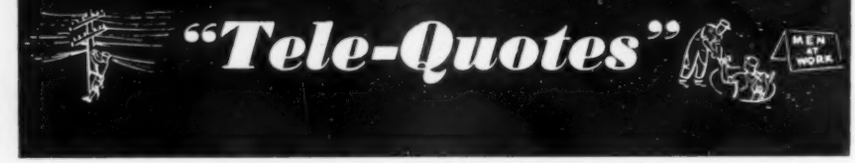
Tinsel Koiled Kords offer the combined advantages of greater flexibility and longer wearing qualities with all the benefits that Koiled Kords provide. Lowered maintenance costs, reduced replacement expense, longer life and terrific users' popularity more than make up the very slight additional cost over straight cords. Koiled Kords' neoprene jackets resist humidity, oil, grease and most acids. Try Koiled Kords where replacements of ordinary cords are frequent and note the savings.



Koiled Kords are distributed by independent telephone manufacturers and suppliers and, on the West Coast, by the Jewell-Summer Co., Los Angeles, Cal.

Koiled Kords
INCORPORATED
BOX K, HAMDEN, CONN.

"Tele-Quotes"



DOLLAR COMPETITION:—"With competition for the consumer dollar expected to get tougher it does not seem wise to urge people to be brief or to place any limitation on the use of telephone service.

For there will come a day when we will not care how long they talk, and we will be urging that they talk for longer periods. In looking ahead for this year and next a number of good advertising themes suggest themselves for consideration when the time becomes right to use them.

"There is the story of how cheap long distance service actually is—most people guess about 40 per cent too high when asked the price of a call. Advertising designed to establish the low cost of typical three-minute calls might do more than merely increase business. It might help to balance some of the criticism of increases in local rates. In addition the increased use of long distance would serve to point up the need and value of the telephone in the home or office. Frequently a long distance call is a dramatic and spectacular example of this value."—**Excerpt from address presented at the Minnesota Telephone Association convention by R. W. Hayes, general traffic manager, Northwestern Bell Telephone Company, Minneapolis.**

• • •

TELEPHONE VALUATIONS:—"We should never forget that the profit motive is the keystone of our economic system and that application of any price fixing policies that restrict an industry to a low and fixed rate of return on either 'aboriginal cost' or 'prudent investment' giving the owners no allowance for any increase in the value of their property as a result of sound planning, able management, good financing, scientific progress and satisfactory public relations, will dry up the source of capital available to the industry for the development and expansion and pave the way to government ownership—a fact, not overlooked, I am sure by some of our socialistic planners."—**Excerpt from address delivered at Minnesota Telephone Association convention by Donald C. Power, attorney, Columbus, Ohio.**

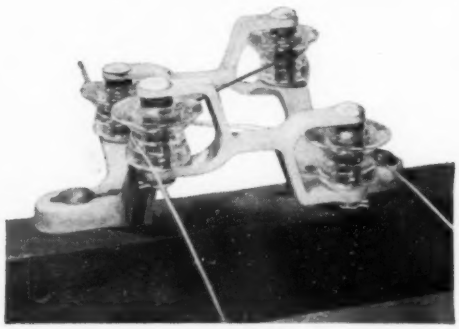
• • •

EX POST FACTO REMEDIES:—"Rate adjustments and approvals are usually 'ex-post facto' remedies. No company desires to run the gamut of rate changes any oftener than is absolutely necessary. Thus in a period of rapidly rising costs such as we have experienced during the past several years, the lag between higher operating expenses and rate relief has been extremely unfavorable to telephone companies. The converse of this is partially true—that in a period of declining costs, telephone companies whose economies are adjusted to the higher level will benefit—but only down to a certain point. . . . Our whole national economy is gearing itself to a plateau of high costs and we have no choice but to follow. Telephone companies have already done their share in 'holding the line' against inflation. We must now retreat to a new stand for our own self preservation."—**Excerpt from address delivered at recent convention of the Minnesota Telephone Association by Charles Cashel, President of the Minnesota association and general manager of the Worthington (Minn.) Telephone Company.**

CARRIER CIRCUIT TRANSPOSITIONS

On Located Poles

The Case *POINT* Transposition Bracket—a worthy companion to the Case *SPAN* Transposition Bracket — offers an improved method for carrier circuit transposition on located poles.



The Case *POINT* Transposition Bracket *reduces tensioning costs* in stringing, or restringing wires . . . the glass insulators *roll* preventing binding in tensioning, allowing free movement of the wire at the transposition point . . . the insulators come equipped with rubber bushings which maintain line circuit operation in event of glass breakage . . . easy to install . . . fabricated from magnesium, lightest of all structural metals . . . weighs less than 4 lbs. complete with insulators.

●

AUTHORIZED DISTRIBUTORS U. S. A.
Western Railroad Supply Co., Chicago, Ill.
Buckeye Telephone & Supply Co., Columbus, Ohio
CANADA: Manufactured by N. Slater Co., Ltd., Hamilton
—Distributed by Northern Electric

TRANSANDEAN ASSOCIATES

INCORPORATED
Consulting Engineers and Constructors
(COMMUNICATION POLE LINES)
30 BROAD STREET • NEW YORK 4, N. Y.

FLOTROL

GIVES YOUR BATTERY THE WILL TO LIVE

The all-new Flotrol battery charger guarantees your battery's life span by accurate floating voltage!

Check these Advantages:

Delivers, Delivers, Delivers

Delivers FULL rated power.
Flotrol operates silently and efficiently.
Instantaneous response to load requirements.
Relieves battery of all normal work load.

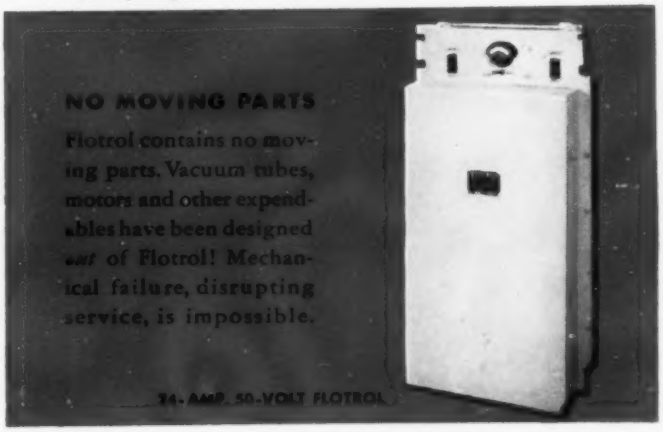
Cuts Power Costs

Stretches your power dollar. Flotrol units reduce power costs up to 20% per year, savings you can't afford to miss.

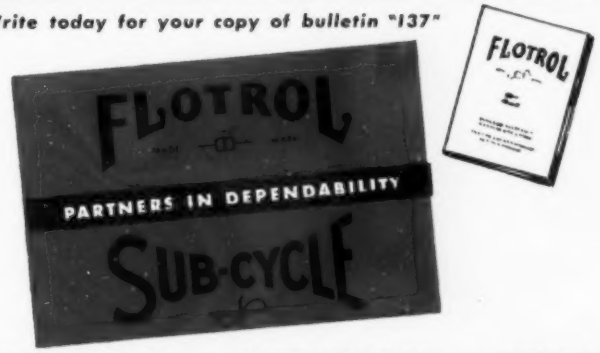
Keeps Battery "At Ease"

Keeps your battery fully charged. Flotrol maintains full floating voltage of 2.15 plus or minus 1% on each battery cell. Your battery is ready to meet any emergency. Puts battery on "standby" orders. With Flotrol your battery becomes only an emergency worker —it stands silently by, at rest, without the wear and tear of normal working conditions. Flotrol does all this without moving a single part!

Flotrol Works— Battery Sleeps


NO MOVING PARTS
Flotrol contains no moving parts. Vacuum tubes, motors and other expendables have been designed *out* of Flotrol! Mechanical failure, disrupting service, is impossible.
24-AMP. 50-VOLT FLOTROL

Write today for your copy of bulletin "137"



LORAIN PRODUCTS CORPORATION • DEPT. C
1122 F STREET LORAIN, OHIO

Stromberg-Ca

STROMBERG-CARLSON No. 120 P. B. X. SWITCHBOARD

The polished walnut veneer, the "suntan" face mounting and the brown formica plugboard impress the observer that the latest industrial design technique has been employed. Wiring and capacity for 80 lines, 15 cords and 15 trunks. Connects to any central energy exchange, manual or dial. Size: 45⅝" high, 25⅛" wide, 32" deep. Designed for rapid, quiet service which is not interrupted even by maintenance.

STROMBERG-CARLSON

Factory, General Offices: Rochester 3, N. Y.
Branch Offices: Atlanta 3, Chicago 6, Kansas City 8, San Francisco 3. In Canada: Stromberg-Carlson Co. Ltd., Toronto

Carlson PBX Switchboards

COMBINE BOTH MODERN CABINET BEAUTY AND TRADITIONAL OPERATING EFFICIENCY

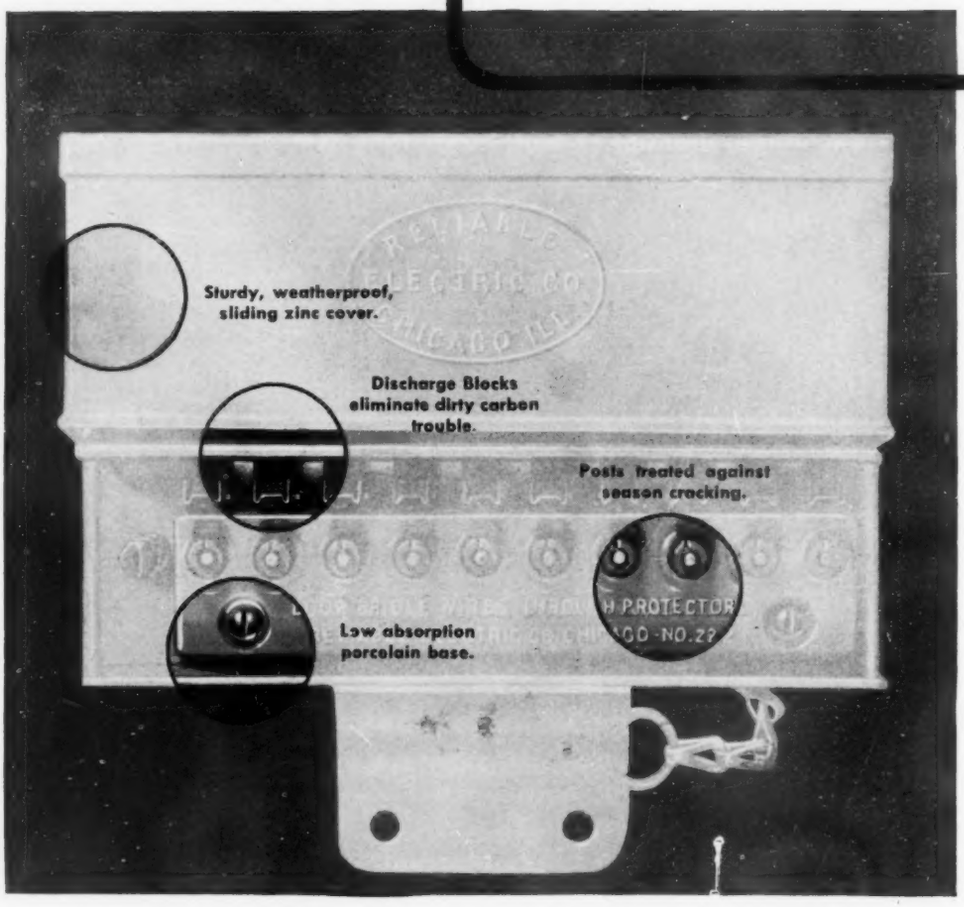
The high quality of Stromberg-Carlson P.B.X. switchboards has been consistently maintained since the first equipment was produced in 1900. During those years, conformity with modern office appointments has become an important requirement. The switchboards shown here will meet your subscribers' most exacting needs and tastes.

Shown below: The No. 121 Cordless P.B.X. Switchboard is a modern example of what can be done in housing mechanical equipment in fine furniture cabinets. Available for quick delivery in two standard models: 1-16 lines, 5 trunks, 5 connecting circuits with line relays; 2-12 lines, 3 trunks, 5 connecting circuits with line relays. Connects with any central energy exchange, manual or dial. 26¾" long, 14" high, 14¾" deep.

TELEPHONES, SWITCHBOARDS • SOUND EQUIPMENT, INDUSTRIAL AND INTERCOMMUNICATION SYSTEMS • RADIOS, RADIO-PHONOGRAPHS, FM AND TELEVISION

"Reliable"

is the word for it!


Sturdy, weatherproof, sliding zinc cover.
Discharge Blocks eliminate dirty carbon trouble.
Posts treated against season cracking.
Low absorption porcelain base.

"—worthy of confidence; trustworthy"—says Webster, and what more could any user ask of any product. The Reliable 222 Outdoor Arrester is a very sensitive, yet rugged crossarm arrester with a ten-wire capacity. Mounted near terminals or along the line, the 222 Crossarm Arresters are of outstanding value where static is troublesome. Rugged, easy to install and thoroughly Reliable. Self-cleaning Sawtooth Discharge Blocks will protect without permanently grounding the line. Build for the future—specify "Reliable."

RELIABLE ELECTRIC COMPANY

3145 CARROLL AVENUE, CHICAGO 12, ILLINOIS

ON LINE CONSTRUCTION AND MAINTENANCE

FWD TRUCKS DO MORE WORK

FWD four-wheel-drive utility trucks are more than mere trucks. They are highly specialized mobile "workshops" essential to line construction and maintenance. From bumper to bumper, they are utility-engineered "tools" for utilities.

The ruggedness and "going power" of FWD four-wheel-drive *power and traction on all wheels* have won for FWDs their reputation as "the trucks that *do not fail* the power lines that *must not fail.*"

Even when winter throws its snow blockades across field and highway, with ice and snow working havoc on communication systems, FWDs carry "trouble-shooting" crews and equipment through to location, on the highway or cross-country. All year 'round, regardless of handicaps of weather, over roadless tracts, safely up and down steep grades, you can rely on FWDs for dependable, profitable service.

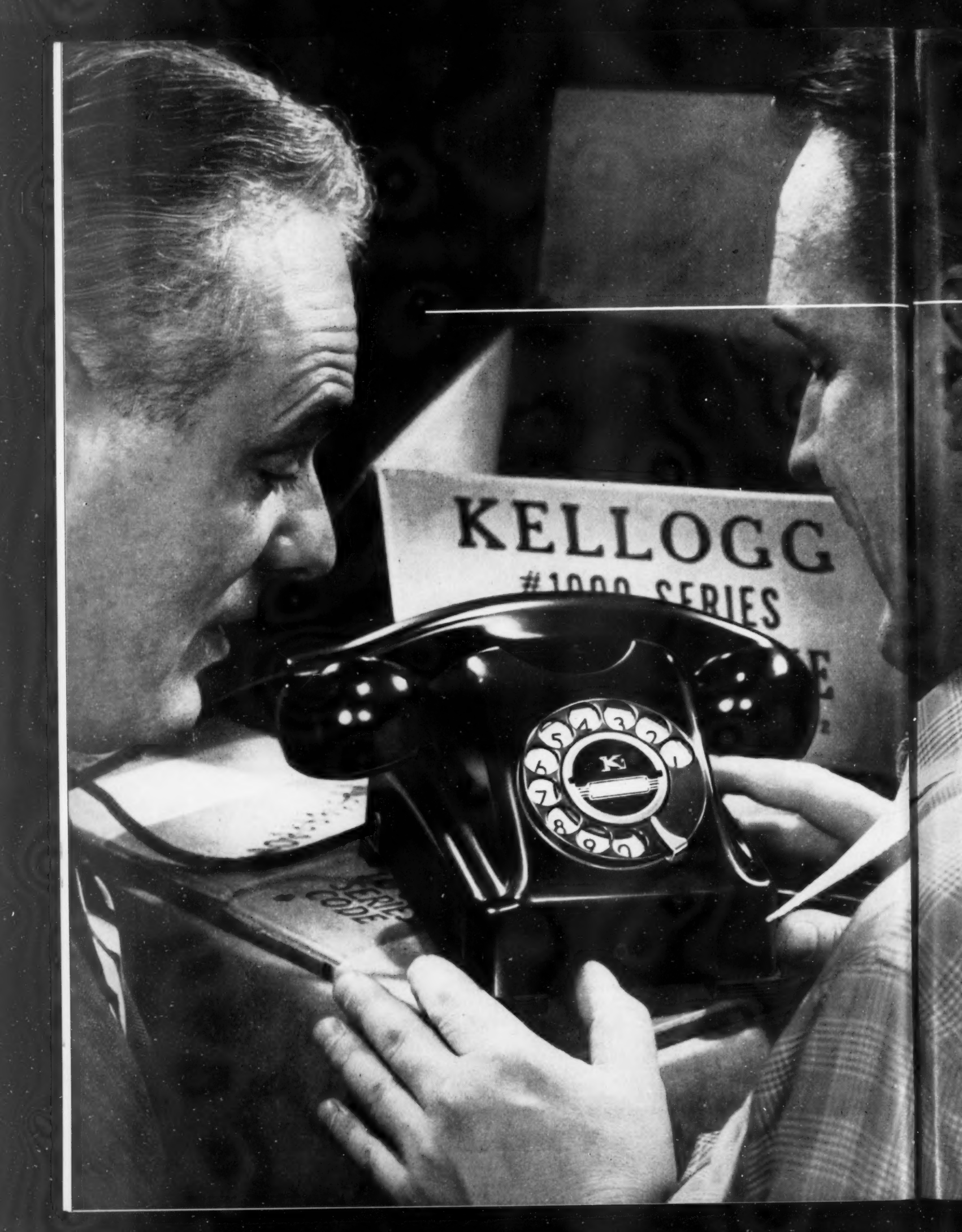
For complete information, see GraybaR, or write—

THE FOUR WHEEL DRIVE AUTO CO.
Clintonville, Wisconsin
Canadian Factory: Kitchener, Ontario
WORLD-WIDE SALES and SERVICE

FWD

Distributed by GraybaR

America's Foremost Heavy-Duty Truck


KELLOGG

HAPPY (AND PROFITABLE) EVENT

It's a red-letter day — that day the shipment of Kellogg 1000 Series Masterphones arrives. It marks the beginning of new high standards of telephone service for the community — and new low maintenance and inventory costs.

Benefits start the day those new Kellogg telephones go into service. Installation is simple, easy and fast. "Universal" in basic design, a single base plate with components takes both wall and desk set housings, for either dial or manual common battery service — and even magneto!

What's more, with induction coil, condenser, circuit and ringer all of the "universal," interchangeable type, adaptations to virtually any service requirement are vastly simplified.

And no telephone, ever before, was so easy to maintain at the peak of operating efficiency. With "plug-in" components, no complex color codes to follow, no circuit wiring to solder, routine servicing is a low-cost, time-saving operation.

There's more — much more — to the Kellogg Series 1000 story — finer reception, transmission and ringing . . . modern, eye-pleasing styling are points subscribers appreciate . . . lower inventory . . . operating dependability. Get the whole story from your Kellogg representative. Speed the day that you receive your new Kellogg 1000 Series Masterphones. It's bound to be a profitable and happy event!

KELLOGG SWITCHBOARD & SUPPLY COMPANY

6650 SOUTH CICERO AVENUE **CHICAGO 38, ILLINOIS**

KELLOGG MASTERPHONES

THE TELEPHONE THAT'S *Years Ahead*

D-1000 Desk Masterphone with dial on universal base plate.

1070 Desk Magneto Masterphone uses same base plate with self-contained generator unit. (Also in wall model.)

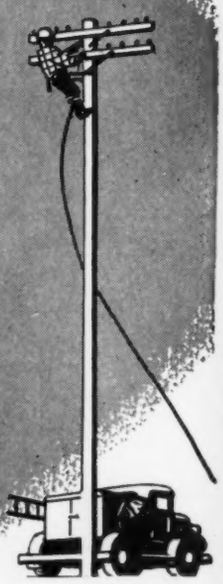
1100 Wall Masterphone for manual service uses the same base plate.

D-1100 Wall Masterphone with dial also uses the universal base plate.

1000 Desk Masterphone for manual service uses the same base plate.

The Satisfaction Lasts
When You Buy Products

Recommended and Guaranteed by **KELLOGG**



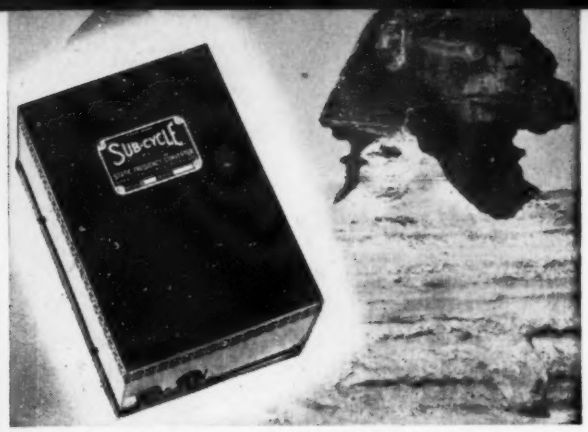
For Long-Lasting Lines—Copperweld Line Wire provides the ultimate in dependability, economy, strength, high conductivity, and rust-resistance. It consists of a thick, protective copper covering, welded to an alloy-steel core. This is the only line wire made by COPPERWELD STEEL CO.'s Molten-welding Process, which assures perfect interlocking of the metals.

Dependable—In Any Weather! Hemingray Insulators defy rain, snow and sleet. They stand on guard through the hottest summer days and the coldest winter nights. Products of OWENS-ILLINOIS GLASS COMPANY, many of these famous insulators are still in service after 20, 30 —and even 50 years. The insulator pictured above is Hemingray No. 9.

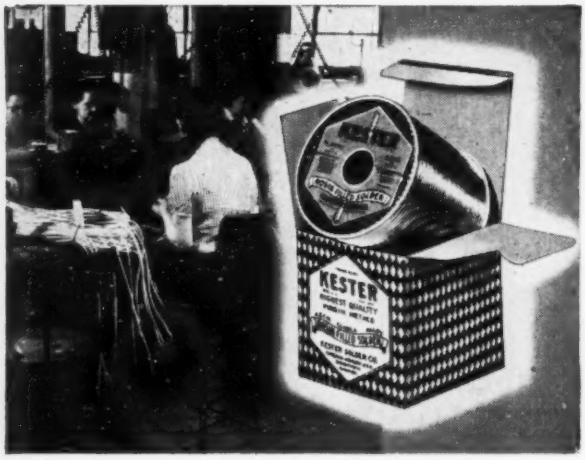
There's three-way satisfaction when you concentrate purchases of line supply and construction materials at a single, responsible source: (1) The *quality* is right—all products are backed by the famous Kellogg DOUBLE GUARANTEE; (2) The service is right—orders are intelligently handled by experienced people; (3) *Delivery* is right—orders are shipped from the nearest of over 100 strategically located distribution points.

KELLOGG SWITCHBOARD & SUPPLY COMPANY
Branch Offices: Kansas City, San Francisco, St. Paul, Los Angeles
Factory and General Offices: 6650 S. Cicero Avenue, Chicago 38

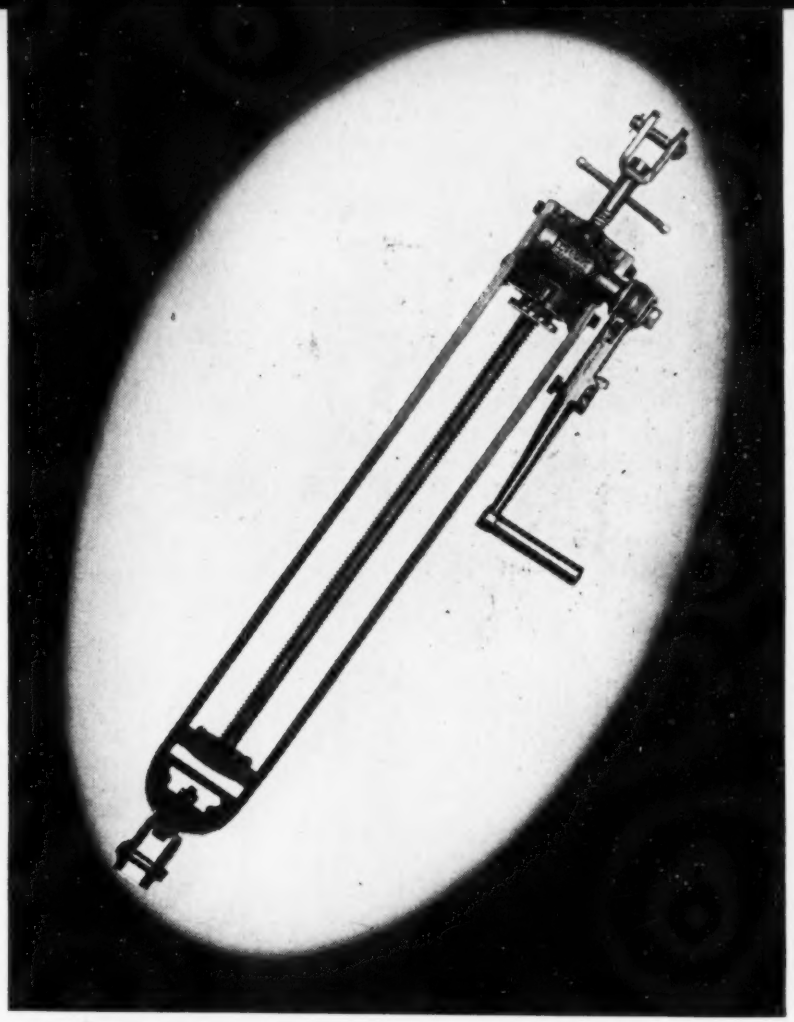
For Service from a Nearby Distribution Point
Order Your Line Supplies from
KELLOGG



Durable and Silent. The Sub-Cycle Master Ringing Converter changes frequency without moving parts, thus reducing wear and consequent adjustment and maintenance. Made by LORAIN PRODUCTS CORPORATION, this static-type frequency converter is available in several models.



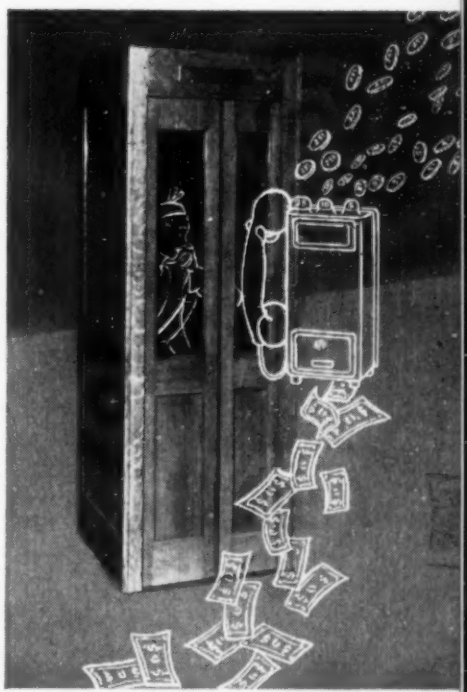
Sealed Against Trouble! Manufacturers of communication equipment insist on Kester Rosin-Core Solder for eliminating high-resistance joints and intermittent open-and-closed circuits. Remember to use KESTER SOLDER CO. Rosin-Core Solder throughout your telephone system.



One Man Pulls as Much Strain as Four when the Matthews Slack Puller is used in place of block and tackle. No slack is lost in dead-ending because it holds strain to the exact point to which it has been pulled. After the job is done, the exclusive Quick Release feature permits quick, easy removal. This feature also allows instantaneous extension. Made by W. N. MATTHEWS CORP.

Fits Telephone Needs to a "T"—Because RAY-O-VAC COMPANY'S Telephone Dry Batteries are built to resist deterioration when not in use, they're especially serviceable for telephone work. Their internal protective coating extends their useful life. The result is lower costs.

Reduce Your Operating Costs with GOULD Floté Telephone Batteries. The experience of many telephone engineers proves that the famous Floté element eliminates low cells in full-float service, lowers maintenance and charging costs, and materially lengthens battery life. Ask today for full details!



Increased Pay Station Revenue—is easily accomplished when you give the privacy, roominess and comfort of CHURCHILL CABINET COMPANY'S Telephone Booths. The No. 100 Booth shown, with automatic light switch and ventilator has long been very popular.

BRIGHT FUTURE

It is pleasant to look ahead. For the future promises greater progress than the past has ever known—more good jobs for men and women in the business and an expanding and improving service for all who use the telephone.

The advertisement on the opposite page appearing in national magazines during February and March, restates the 72-year-old telephone industry's faith in the future.

AN ADVERTISEMENT OF THE BELL TELEPHONE SYSTEM

"THE BEST IS YET TO BE"

The telephone will be seventy-two years old this year. Its development within a single lifetime has been a modern miracle. Yet it is only the beginning.

There are any number of men and women in the telephone business today — some just starting out—who will see greater progress than the past has ever known.

Year by year the next half century will be increasingly theirs. New leaders will appear from among them. Step by step, rung by rung, they will mount the ladder to the top.

For telephone management is employee management and comes up from the ranks.

There will be more good jobs in the telephone business in 1958 and 1998 than now. It just can't help being that way. For of all the trades and professions there are few more interesting and necessary.

So the future is bright for those who work for the telephone company, for those who use the telephone and for those who have faith in its growth and development. "The best is yet to be."

BELL TELEPHONE SYSTEM

REPLACE WORN CLUTCHES NOW!

Get New Clutch Service at 2/3 the Cost

AVAILABLE NOW FROM YOUR INTERNATIONAL DEALER OR BRANCH

INTERNATIONAL Factory-Rebuilt EXCHANGE CLUTCHES

Same International Warranty as for New Clutches

HERE'S your chance to immediately replace worn, slipping clutches—quickly, easily—and save one-third the cost of new clutches.

Right now your International Dealer or Branch has International *Factory-Rebuilt* Clutches for all models of International Trucks.

These clutches are ready for immediate installation. You lose no time waiting for old clutches to be overhauled.

You get International Clutches that give the same service as new clutches—that carry the same International warranty.

And the cost to you is two-thirds or less.

Act now! Avoid lay-ups and delays! Get better truck performance! Have your International Dealer or Branch install International Factory-Rebuilt Clutches now.

Other International Exchange Units

Your International Dealer or Branch has many other International Truck Exchange Units. Same quick installation as clutches. Same new unit service at a substantial saving. Get details, sure.

Motor Truck Division
INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

Tune in James Melton on "Harvest of Stars!" NBC Sundays.

THIS EMBLEM IDENTIFIES GREAT TRUCKS
INTERNATIONAL

INTERNATIONAL Trucks

EDITORIAL

People and Dollars

WE THINK there is too much talk about labor vs. capital or capital vs. labor, and not enough talk about labor AND capital or capital AND labor.

Labor and capital are, inseparably, parts of every business. You cannot have a business without people being willing to work for it, but you also cannot have a business unless somebody is willing to take the risk of putting up the money necessary for supplying the things people work on or with.

In the Independent telephone business, for instance, there was an investment of capital, at the end of 1946, of somewhere between $13,000 and $15,000 for every employee in the business. Beyond doubt the amount of investment per employee has increased since that time (more recent data is not yet available), because the costs of equipment, plant and other things that have to be provided for the business have increased since the end of 1946.

Because of this increase of costs—some 50% since prewar days—there will likely be required, before long, an investment of capital in the business of around $20,000 per employee; perhaps more.

Without that capital in the business, as well as without the employees, there would be no Independent telephone business to employ anybody.

In one way the employee has a considerable advantage over the investor of capital: The employee gets his pay before, and whether or not, the investor gets anything, either interest or dividends. The employee has, as to his pay, a prior lien on the gross revenues of the business.

If the employees get too much of that revenue, and, in consequence, the investors get too little or nothing at all, there won't be any more capital invested in the business. And that kind of situation can bring on plenty of trouble for all concerned.

It has been recently estimated by managements and financial people that three classes of public utilities—power, gas and telephone—will have to have around 10 billion dollars or more of new money invested in them during the next 5 years for expansion of those businesses to meet the public demand for their services. A substantial part of this amount is for the telephone business.

If investors supply that money, there will be a lot more jobs, and many better jobs, in those businesses than there are now. There will be many opportunities, in such expanded systems, for the advancement of present employees, as well as a large need for new employees.

One thing that has made higher wages possible in industry is that capital money has been cheaper, during several years past, than ever before. Now, however, there are increasing signs that investors are not so willing to put money into utilities; at least not at prevailing low interest rates. There has also been a slump in investments in preferred stocks. Investors, including the big institutional investors—such as insurance companies—have apparently made up their minds that they are not going to supply all the money needed for buying things for employees to work with or on, unless they get a larger share of the gross revenue than they have been getting.

If this problem is worked out so that each side gets its fair share of the revenues, the business will expand and both sides will be benefited. If, on the other hand, either side demands so much of the revenue that the other receives less than its fair share, then both sides will be hurt in the long run. The problem is not one of labor vs. capital, it is one of both labor AND capital.

(The foregoing editorial, although copyrighted, may be reproduced in whole or in part, without charge, provided credit is given this publication and a copy of such reproduction is filed with this publication. This legend need not appear on the reproduction.)

WASHINGTON

Bureau REPORTS

BY ROLAND DAVIES and FRED HENCK

Rates

ONE OF the most cogent decisions handed down by a rate regulatory body in years is being examined with interest by Washington circles interested in the telephone industry.

The order was by the North Carolina Utilities Commission, on the petition of Southern Bell Telephone & Telegraph Co. for a $680,000 supplemental rate boost. Southern Bell received an increase in North Carolina late in 1946—the first post-war rate boost of a Bell System company—and the North Carolina agency at that time demonstrated that it was no "rubber stamp" body by cutting some of the company's rate proposals and ordered that the rates be effective for 14 months during what was hoped at that time to be a temporary inflationary condition. For those reasons, its decision to give Southern Bell every cent of its supplemental petition makes especially interesting reading.

The commission emphasized that in considering the case "it is forced to take cognizance of conditions not only in North Carolina but in the other eight states served by the Southern Bell as the company's ability to successfully operate in this state depends upon the integrity of the company in its corporate capacity which is marred or promoted by the action of individual states. It is therefore apparent that what is being done or what is not being done in the other states with which this state is linked in a corporate capacity is of vital concern to the commission."

Noting the precarious position of Southern Bell in other states, the agency went on, "This situation is giving this commission grave concern because it is obvious . . . that a company in this plight is not in a position to get new money needed for its unprecedented expansion program by the sale of stock or bond issues. It is, therefore, apparent to this commission that unless the several regulatory bodies, including this commission, provide rates which will provide a fair profit to the company the expansion program needed will be crippled or negated. While this commission will provide rates which it deems adequate in this case, it wants it emphatically understood that it is unalterably opposed to granting the company any increase in revenue for the purpose of subsidizing any losses which are sustained or may be sustained in any other state or states in which the company operates.

"It must be kept in mind that telephone service is different from that rendered by any other utility in that all parts of the country are interconnected. People in this state talk to people in other states, people in other states talk to people in this state, and if the service in any state through which their conversation is transmitted is poor, the whole service is poor just as no chain can be stronger than its weakest link."

Noting that a $15 million expansion program is planned for the state this year, and the fact that 35,000 held orders were pending Jan. 1, the commission declared that "The people of North Carolina are clamoring for this needed expansion and this commission is anxious to see it carried out, believing that the increased facilities would add millions of dollars to profits to the business and other interests of North Carolina, while the crippling of the proposed expansion program would no doubt mean the loss of millions of dollars to the people of the state.

"In view of the water-logged situation presented above, this commission is anxiously willing to cooperate with every state involved in any effort to provide rates which will assure the company a fair profit. A contrary course, in the opinion of the commission, would be like killing the goose that lays the golden egg for it is obvious to even the novice that unless

Sell More Toll Service | by R. ALLEN

WOULD YOU like to sell more toll service to those subscribers that seldom use it now? A sure fire toll sales idea is to conduct a phone "questionaire campaign" with your subscribers. Determine their "toll points of interest", then follow through by preparing and furnishing them with a small memo book or convenient card listing the names of relatives or friends they might be interested in calling in other cities and the cost of any call.

A girl with a pleasant telephone voice and following a set formula should not find it difficult to get information from subscribers as to whom they might like to call long distance. It might even be worthwhile to send postal card forms to other companies to get the actual telephone number of each name to be listed. The long distance "People I Should Call" booklet or card should be so arranged to encourage it being kept conveniently by the telephone. The booklet or card should carry a short sales appeal pointing out that long distance calls are surprisingly cheap, particularly at off-peak hours, and that anyone can afford to talk with their friends and relatives frequently. Many people still think the cost of a long distance call is high and beyond their means, and when shown the rates for modern long distance service, they are agreeably surprised.

the company is put in a position to give good service and provide the necessary expansion the result would be disastrous, not only to the company but to the public as well."

In other recent Bell System rate cases, the approach of the commissions has been somewhat different. Southern Bell went to court and obtained a temporary injunction permitting it to charge its proposed rates in Georgia, after the Public Service Commission handed down a verdict allowing it about 37% of the $4 million requested. The commission disallowed about $2.3 million of the company's operating expenses, including the entire payment to the American Telephone & Telegraph under the license contract.

In Kansas, the Southwestern Bell Telephone Co. is seeking a rehearing following Corporation Commission action in dismissing its rate request. The commission took the position that a 1931 statute, requiring utilities buying equipment from an affiliated manufacturer to prove the reasonableness of the prices, would require the telephone company to prove the price fairness of each of the more than 100,000 equipment items it buys from the Western Electric Co.

Coy, Sterling Nominations Approved by Senate

WAYNE COY of Indiana, former assistant budget director and assistant to Paul V. McNutt in the latter's post as Philippines High Commissioner and Federal Security Administrator, has become a full-fledged chairman of the FCC after a long political battle. Mr. Coy was indicated as President Truman's choice for the commission post soon after chairman Charles R. Denny resigned last October, but his appointment did not come until almost the end of 1947.

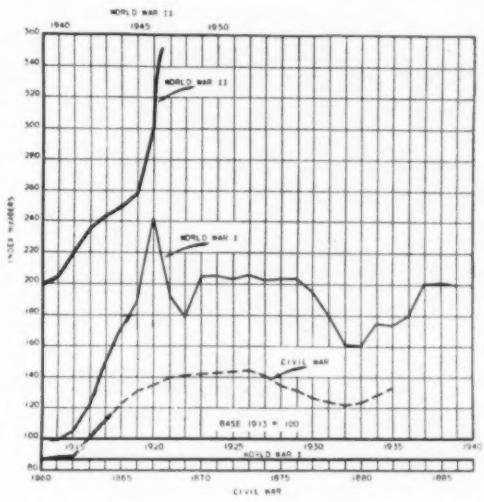
Spirited Republican opposition to Mr. Coy's background in the New Deal never did materialize, and it remained for Senator Charles W. Tobey of New Hampshire, who frequently goes counter to the GOP leadership, to provide the only apparent opposition to the nomination. Senator Tobey, as Acting Chairman of the Interstate and Foreign Commerce Committee during the hospitalization of Chairman Wallace H. White, Jr. (R., Me.), demanded that Mr. Coy repudiate allegations that he is under the influence of Mr. Denny, now a Vice President of the National Broadcasting Co. Mr. Coy did, apparently to the satisfaction of the Committee, and he was reported out favorably and later confirmed by the Senate.

The nomination of George E. Sterling, former Chief Engineer of the FCC, to the Commission was approved at the same time. Mr. Sterling's reputation as an engineer is of the highest, and his confirmation was never in doubt.

Construction Cost Trends | by R. ALLEN

A PRINCIPAL topic of conversation among plant men is the continued upward trend in construction costs. The 64-dollar question is, "When will construction costs level off. Will they drop off abruptly as they did in 1920 or will they continue upward for several years as everything else seems to indicate"? J. P. Anderson of Ibasco Services, Inc., New York City, recently presented to an Engineering conference the accompanying chart which shows the fluctuations in construction costs (labor, material, etc.) before, during, and after World Wars I and II, and of wages during the Civil War period.

The trends during the three war periods are plotted to the same base. If history repeats itself as shown after World War II, it is now time for construction costs to at least level off and possibly recede rapidly. Mr. Anderson makes two pertinent observations, viz:



Effect of Wars on Construction Costs. (Courtesy Edison Electrical Institute.)

(1) That the increase in construction costs can be traced largely to the increase in labor costs and the indirect effect of labor costs on the cost of materials.

(2) Even though construction costs level out and become stabilized, the stabilized level will be much higher than pre-war cost levels, hence, little can be gained by postponing needed plant rehabilitation or extension projects in the hope that prices will recede to the levels that prevailed prior to World War II.

NARUC-FCC Staff Group Begins Probe of Western Electric

WITH THE objective of determining the overall reasonableness of Western Electric cost allocation and pricing policies in their relationship to telephone rate regulatory proceedings, the National Association of Railroad and Utilities Commissioners, through its Telephone Committee, and the FCC have sanctioned cooperative preliminary study of Western Electric costs, profits and prices.

The studies, it is planned, could provide a basis for determining the advisability of making a full-fledged complete investigation of the manufacturing branch of the Bell System on an FCC-state commission cooperative basis. However, it was deemed doubtful whether this full-fledged investigation plan would result, since it would mean the outlay of between $500,000 and $1 million by Congress or jointly by Congress and the state legislatures, and the sanction of such an expenditure would be difficult to obtain. Furthermore, in the present period of high employment the assembling of a staff of qualified accountants and engineers on a temporary basis would be most difficult.

It was emphasized that it will not be any sort of a "witch hunt" but will be aimed to get the accurate and basic facts of the situation in regard to the general cost allocation and pricing policies for telephone apparatus, equipment and supplies furnished by Western Electric to the associated Bell System companies.

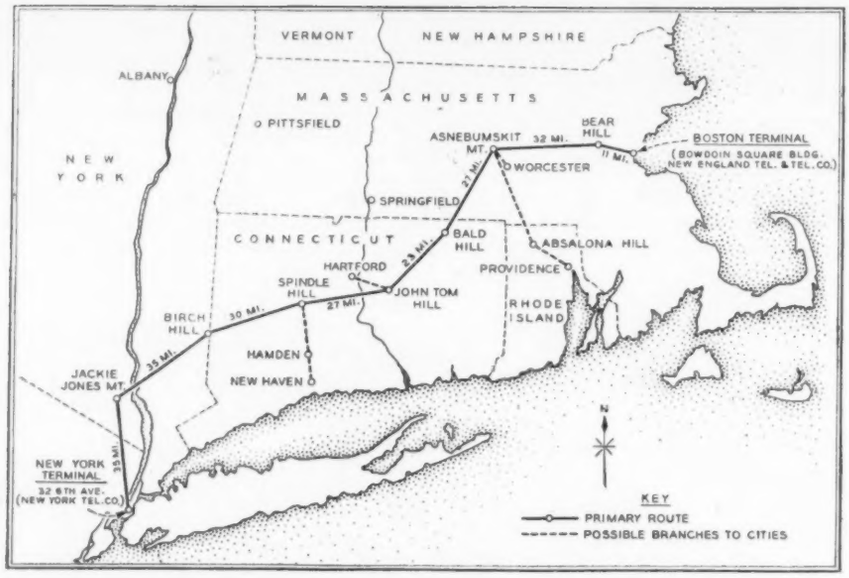


Fig. 1—Route of the microwave relay system between Boston and New York.

A MICRO W Between N

By

A. L. DURKEE

Radio Projects Engineer, Bell Telephone Laboratories

NEW YORK-BOSTON relay system features wartime microwave developments applied to peacetime communication needs. Installation will permit evaluation of many economical and technical aspects of microwave relaying.

FOR A NUMBER of years Bell Telephone laboratories has carried on a program of research and development to find out how radio relaying might supplement wire and cable facilities in the telephone system. This program had advanced well into the microwave region before it was interrupted by the war, which brought rapid progress in microwave electronics and circuit techniques. In the relay system installed between New York and Boston, some of these wartime microwave developments are applied to peacetime communication needs. The installation is essentially a full-scale field trial in which it will be possible to evaluate, under actual operating conditions, many of the economic and technical aspects of microwave relaying as a means for providing circuits for multiplex telephony, television, and various other broadband services.

System Provides Two Broad-Band Channels

THE SYSTEM operates at frequencies in the vicinity of 4,000 megacycles (wave-lengths around 7.5 cm) and provides two two-way broadband communication channels between New York and Boston. Each channel has been designed to handle a signal band extending from 30 cycles up to 4.5 megacycles, with noise and distortion characteristics satisfactory for the transmission of present standard black and white television signals, or a considerable number of telephone channels using either time division or frequency division multiplex methods. In planning the system, the objective was not only to keep noise and distortion to low values, but also to insure a degree of reliability of performance such that the radio system could be integrated with the wire network.

One important factor that may affect the reliability of a microwave radio circuit is fading of the signals due to variations in atmospheric conditions over the transmission path. An essential step in engineering the new system, therefore, was to investigate the fading conditions that would have to be overcome to insure continuity of service.

A. L. DURKEE, Radio Projects Engineer, Bell Laboratories.

In this connection, a series of microwave propagation tests was made on a representative line-of-sight path 40 miles long, extending from the roof of the New York Telephone Company building at 140 West Street to a hilltop near Neshanic, New Jersey. Data on transmission variations over this path were obtained by sending continuous carrier signals from New York and making continuous graphical records of received field intensity at Neshanic. The tests were carried on for a period of about two years to be sure that seasonal variations in propagation conditions were adequately covered. In the course of this investigation, observations were made at five different carrier frequencies ranging from 720 to 24,000 megacycles. The tests also included a comparison of fading on the over-all 40-mile path and the two 20-mile paths obtained by setting up a temporary field station midway between New York and Neshanic. The information provided by this test program was useful in deciding on the frequencies to be employed in the relay system, the fading range to be accommodated in the repeaters, and the maximum separation to be permitted between repeater stations.

Requirements For Site Selection

SEVERAL requirements had to be considered in selecting the sites for the repeater stations. To insure

WAVE Relay System
New York and Boston

satisfactory transmission over a microwave circuit, it is important to have a clear line-of-sight path between the transmitting and receiving antennas. The first requirement on a prospective station site, therefore, was that it be capable of providing an unobstructed path to the other stations with which it must work. This immediately put a restriction on the repeater spacings that could be obtained with reasonable tower heights. However, experience in the Neshanic tests and from other sources indicated that the depth of fading of microwave signals increase rapidly with path length. For transmission between New York and Boston, it was considered advisable to limit the repeater spacing to a maximum of about thirty-five miles, even though longer line-of-sight paths might be readily obtainable. Very short paths were avoided insofar as practicable, so as to minimize the number of repeaters in the system.

The first step in the selection of the route consisted in making a careful study of topographic maps of the terrain. High spots were picked out on the maps, and profiles of the transmission paths between them were plotted to determine whether the paths were unobstructed. If transmission considerations alone had been allowed to govern the choice of sites, some of the locations selected would undoubtedly have turned out to be very difficult to reach. In laying out the route, it was kept in mind that an entrance road would have to be built to each site, and that power and telephone lines would have to be brought in. An effort was made, therefore, to select high points which were close to existing roads as shown on the maps; less accessible locations were considered only when the profiles to the points first selected were found to be unsatisfactory.

As a result of this study, a chain of seven preferred sites was chosen, together with a number of alternates in case the first choices proved to be unavailable. The route finally obtained is shown in Figure 1. The average length of the eight repeater sections is 27.5 miles. The longest section is 35 miles, and the shortest about 11 miles. Before the sites were actually purchased, the ground elevations at them and also at high points along the transmission paths were checked against known elevations with a precision altimeter. This was done as a precaution against possible inaccuracies in the topographic maps. A final check on the suitability of the sites was obtained from radio transmission tests carried out with portable equipment. Representatives from the Long Lines Department and from the associated companies in the New England area collaborated in the task of determining the route and securing the sites.

The choice of operating frequencies for the relay system has an important influence on antenna and tower design, as well as on the output power requirements of the repeaters. Broadly speaking, frequencies in the range from 1,000 to 10,000 megacycles have possibilities for microwave relaying. There are advantages to be gained from using frequencies as high in this range as practicable. By so doing, antennas of moderate size can be built which will provide high directivity. This confines the radiated power to a narrow beam, thereby reducing repeater power requirements and also the possibility of interference into and from neighboring systems. However, frequencies in the upper part of the 1,000 to 10,000 megacycle range are subject to rain attenuation, the severity of which increases rapidly with frequency. Furthermore, the Neshanic tests showed that fading tends to be worse at the higher frequencies. With these considerations in mind, frequencies in the vicinity of 4,000 megacycles were finally chosen for the system between New York and Boston.

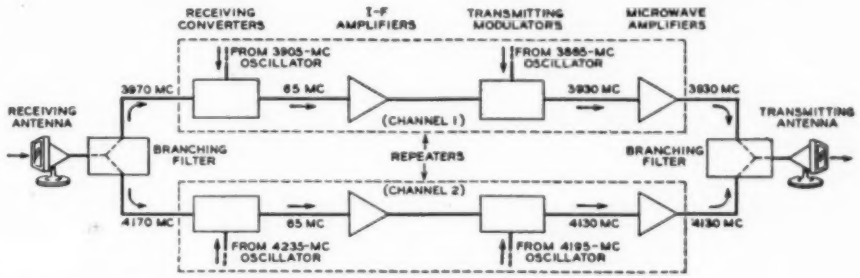


Fig. 3—Block diagram of a repeater station.

To transmit the two two-way broadband channels, four radio frequency bands, each about 10 megacycles wide, are employed. These bands are centered at 3,930, 3,970, 4,130 and 4,170 megacycles, and they are used in pairs. One pair is required for each two-way channel. Whenever the signal goes through a repeater, however, a frequency change is made, 3,930 to 3,970 megacycles for example, to avoid interference between the high-level outgoing and the low-level incoming signals. In the next repeater station, the change is from 3,970 back to 3,390 megacycles. Two frequencies are thus used for transmission in one direction through the system, but the same

(*Please turn to page* 58)

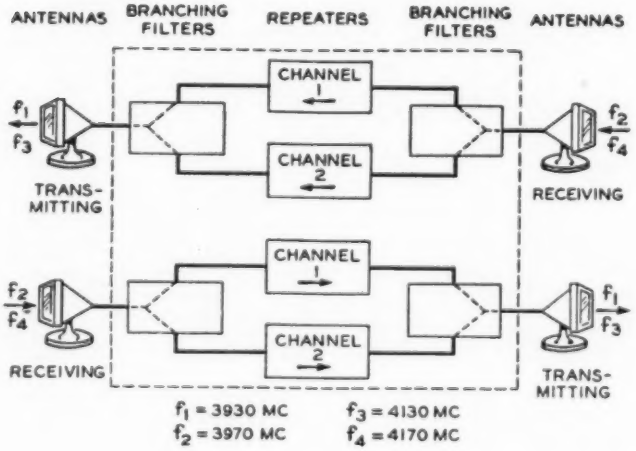
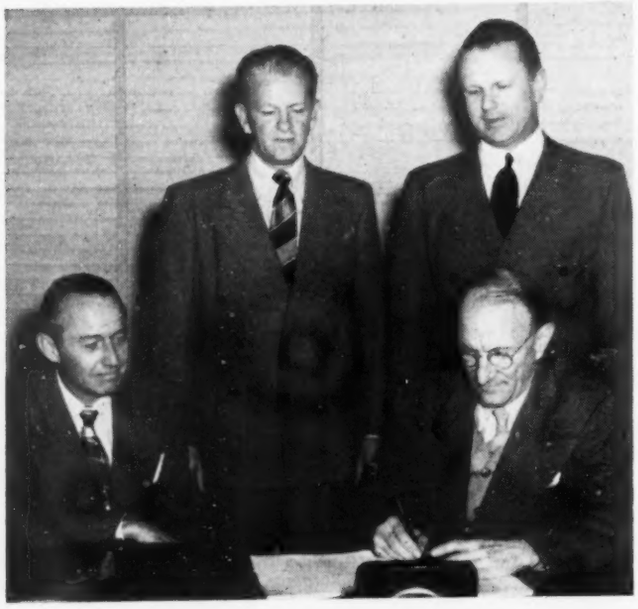


Fig. 2—Frequencies are shifted at repeater stations to prevent having signals of high and low level at the same frequency.

TELE-VIEWS

T E & M Camera snapped this photo at recent Minnesota Convention. Left to Right: Sherm Brooks, Minneapolis; De Witt Gibson, and Richard Faulhaber of Leich Sales, Chicago, and Don Sorensen of Telephone Engineer Publications, Chicago.

FRANKLIN C. CRAWFORD, Stromberg-Carlson factory sales, has been advanced to the position of telephone traveler, according to sales manager T. C. (Tommy) Thompson. Mr. Crawford will cover the New England states and all counties in New York state east of Monroe, Ontario, Gates, and Steuben.



J. Walker Crider, pres., Los Gatos (Calif.) Telephone Co., signs contract that will give Los Gatos and several surrounding towns automatic service. Left to Right: E. R. Sears and Sheldon Guess of Kellogg Swbd. & Supply Co., Lyndon Farwell, vice pres., Los Gatos Telephone Co., and Mr. Crider.

Send in Your News Photos

THE EDITOR of TELE-VIEWS will welcome photos of interesting activities in which members of your company participated. Send photos direct to TELEPHONE ENGINEER Publications, 7720 N. Sheridan, Chicago 26, Ill.

Fred Praender, president-elect of Minnesota association and group of friends photographed in Stromberg-Carlson rooms during recent Minnesota convention.

Old-time photographs continue to come in. Above photo was taken in April, 1915, at cutover of Tampa, Fla., exchange to automatic service.

★

OPEN Wire Terminations

★

By

J. S. REED

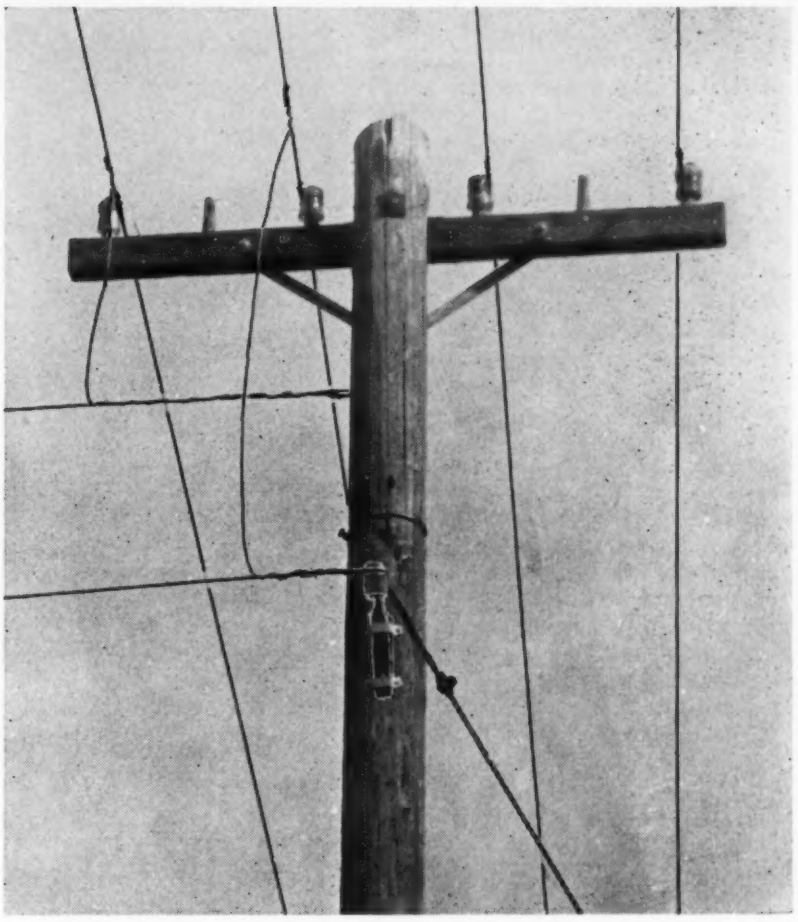


Fig. 2—Farm line spur connected to main line.

IMPROPER CONNECTIONS at open-wire terminations cause variety of trouble. Author Reed suggests method of properly connecting wire at termination points to eliminate or minimize trouble.

A TERMINATION in an open-wire line is said to occur at one of the following points, namely, (1) connection of subscriber's drop to a main open-wire line or to an open-wire spur, (2) connection of a spur line to a main open-wire line, and (3) connection of the main open wires to cable. Figures 1 to 3 illustrate examples of such terminations.

Many troubles that occur in open-wire lines are traceable to improperly made connections at these terminations. It is a well known fact that drop wire or spur wire should not be connected to bare open wire by means of a hand connection, that is, by wrapping the bare end of the drop conductor or spur wire around the line wire. Such a connection cannot long remain electrically perfect since corrosion soon sets in and causes the splice to "go high." A hand connection can never be tight because of the springy characteristic of the connecting wire.

It is the purpose of this article to discuss methods of properly connecting wire at termination points to eliminate or at least minimze trouble at these points, and describe the use of test connectors and tap compression sleeves.

IF TEST connectors are used, they should be of the proper type and should be properly connected; otherwise they may "freeze" on the line wire. When this happens, the connector may break or its threads may be stripped when an attempt is made to disconnect the drop or the spur for line tests or other reasons, necessitating replacement of the damaged connector. Properly designed connectors are equipped with tinned or plated washers to separate the wires from intimate contact when copper or bronze conductors are to be joined to iron wire. This reduces the galvanic action that might otherwise occur when dissimilar metals are in contact and minimizes the corrosive action. Rounded edges and smooth surfaces of the connectors prevent nicking of the wires. Some companies advocate wrapping the connection with rubber tape and friction tape to reduce corrosion at this point.

Figure 4. illustrates several types of connectors popular with many telephone companies, and Figure 1 shows a typical use of test connectors to connect a subscribers drop to an open-wire spur.

Use of Compression Type Tap Sleeves

IN RECENT years, there has been a growing tendency to utilize off-

set tap compression sleeves for connecting spur and drop wires to open wires. This type of sleeve has a longitudinal groove in the portion of the sleeve to be attached to the wire. This part of the sleeve is slipped over the line wire and then securely crimped thereon. It is thus unnecessary to cut the wire for making the tap.

For connecting a farm line spur to a main line, the tap compression sleeves are attached as shown in Figure 5. First, the spur is dead ended on the main line pole, using compression type dead-end sleeves or dead-end wedge clips as desired to attach the wires to the insulators on the brackets. The tail wires (jumpers) are then brought up to the main line wires as indicated in the illustration. The end of each wire is wrapped around the corresponding line wire to support the splice and prevent the wires from breaking at this point. The tap wire is then spliced to the main line wire with an offset compression sleeve as explained in Figure 6. Care should be taken in making this connection to follow the proper order indicated and to avoid bending the sleeve in any way after it has been crimped to the main line wire.

Before splicing, the tap and main wires should be thoroughly cleaned even if the wire is new. For this purpose it is suggested that strips of emery cloth measuring 3" x 6" be utilized. The strips are folded over once along the short dimension with the emery side in and then riveted in one of the corners on the folded side to prevent unfolding. A coarse grit cloth should be employed for galvanized iron wire and a fine grit for copper wire. Care should be taken not to remove too much galvanizing when using the coarse grit cloth on galvanized iron or steel wire. The cloth back of the emery cloth may be used for wiping off the powdery residue remaining on the cleaned wire afterwards. It should be noted in this connection that the manufacturer of the tap sleeve recommends taping the completed splice with rubber tape followed by friction tape. This is done to protect the splice and to dampen out line wire vibrations that might crystallize the connecting wire at this point.

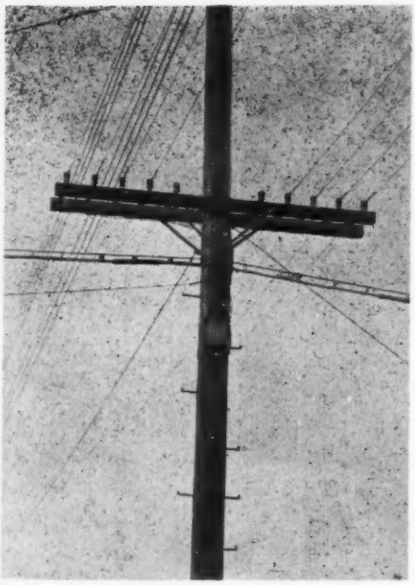


Fig. 3 (above)—Connecting open wire lines to cable.

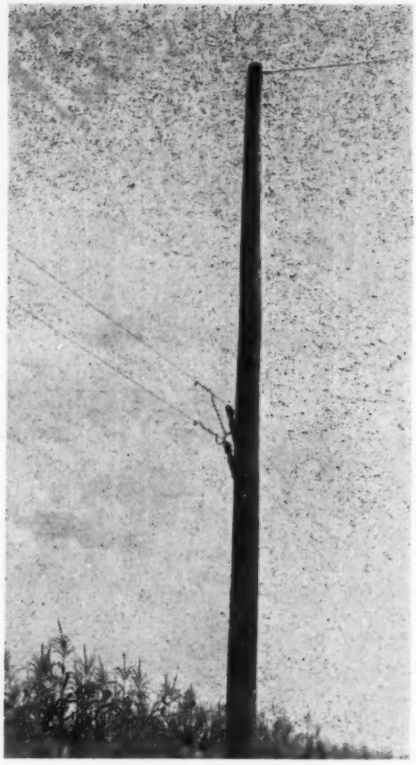


Fig. 1 (right)—Subscriber's drop connected to a spur line. (Note use of test connectors.)

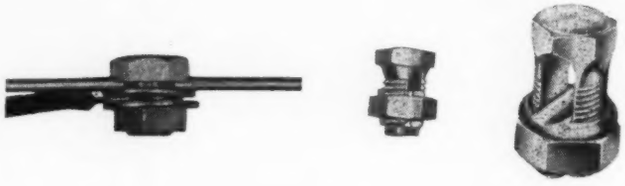


Fig. 4—Types of test connectors used in connecting wires.

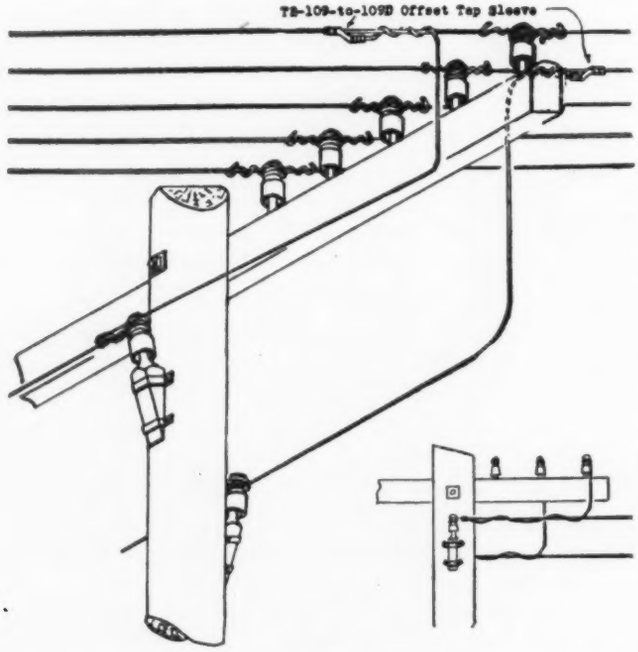


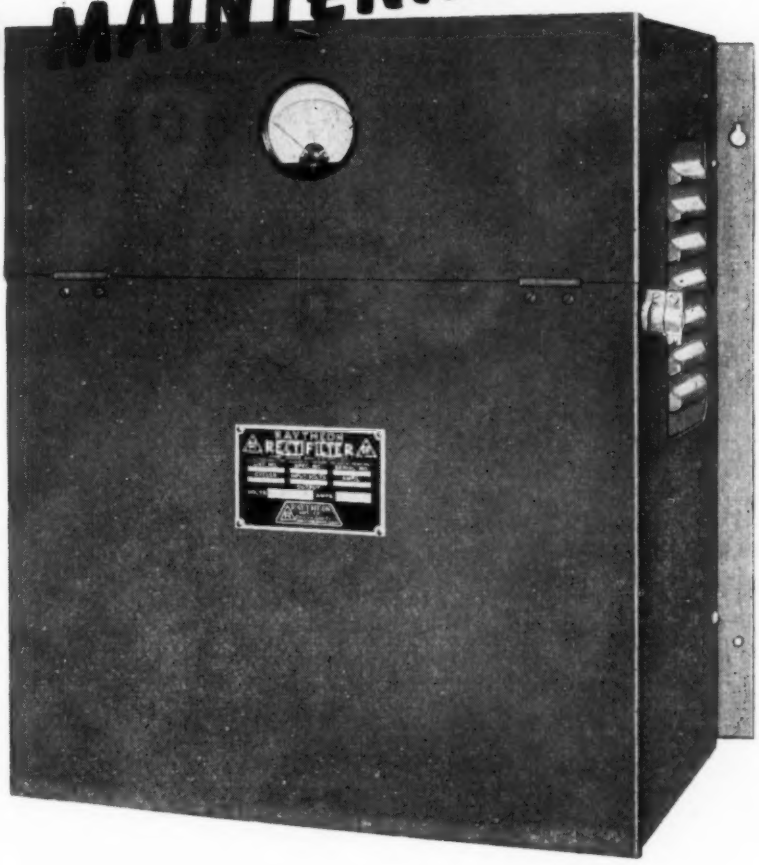
Fig. 5—Showing how spur line may be connected to main line by running the tails of the spur directly to the main line wires. (Inset shows alternative method when main line is directly over spur line.)

Figures 7 and 8 illustrate the use of bridle wire to connect a spur line to a main line when it is not practicable to run steel wire jumpers directly in the foregoing manner.

When it is desired to open the spur line connection for tests, the bridle wire is cut at point "A" in Figure 7. On completion of the test, the wire ends are spliced together with small compression sleeves, using a small hand compressing tool designed for this purpose. Subsequent openings may be made at other places along the bridle wires, insuring a trouble free connection each time. Care should be taken to stagger the splices and to tape them each time to prevent the possibility of short circuiting the line.

(*Please turn to page* 63)

NEEDS NO MAINTENANCE



Raytheon Rectifilter . . .

. . . the modern, low-cost source of stabilized DC voltage

The Raytheon RECTIFILTER provides a highly efficient, time-tested method of supplying continuous, stabilized DC voltage direct from an AC source. The design includes a dry plate rectifying unit plus an exclusive Raytheon DC stabilizing circuit which operates magnetically and automatically. The Raytheon RECTIFILTER never requires adjustment . . . needs no maintenance whatever.

Your regular supplier of telephone equipment will be glad to help you select Raytheon RECTIFILTERS for your requirements.

CLEAN AIR
KEEPS SERVICE STANDARDS HIGH

Airborne dust and dirt, the bugaboo of intricate telephone equipment, can now be eliminated from exchanges. The Raytheon *Precipitator* cleans air electronically, cuts maintenance costs, improves efficiency of equipment and personnel. For complete information, write for Bulletin DL-P-503T.

RAYTHEON PRECIPITATOR

RAYTHEON MANUFACTURING COMPANY
COMMERCIAL PRODUCTS DIVISION • WALTHAM 54, MASS.
Industrial and Commercial Electronic Equipment, Broadcast Equipment, Tubes and Accessories
SALES OFFICES: ATLANTA · BOSTON · CHICAGO · CLEVELAND · DETROIT · NEW YORK · WASHINGTON

RAYTHEON
Excellence in Electronics

T. &. E M. Camera was busy during Minnesota convention. LEFT PHOTO (left to right): C. C. Pearce, Al Bowden, Pete Ferguson, Tom Macoubrary, Chester Ruth, P. M. Ferguson, Jr., and George Morse. RIGHT PHOTO includes Howard Fine, Dan McNulty, Al Bowden and Cliff Pearce.

MINNESOTA Independents Hold 39th Annual CONVENTION

By RAY W. SMITH

Editor, Telephone Engineer Publications

MINNESOTA TELEPHONE Association lead off 1948 telephone conventions with three-day meeting at Hotel St. Paul, St. Paul, Minnesota, January 26-28. Approximately 450 telephone men and women attended sessions giving visible evidence of the industry's continued emphasis on improvements and expansion to provide the public with the best possible telephone service.

Officers elected were: President, Fred Pfaender, president of the New Ulm Telephone Company; vice president, Irving Todd, secretary-treasurer of the Hastings Telephone Company; and secretary-treasurer, J. C. Crowley, Jr., St. Paul. With his reelection, Mr. Crowley started his second quarter century of work as secretary-treasurer of the Minnesota association.

Leo Fisher, secretary of the Walker (Minn.) Telephone Company was elected to the board of directors. Other members of the board were re-elected as follows: H. James Boyd, Alexandria; G. M. Davis, Morgan; G. M. Dwelle, Lake City; W. A. Eckles, Blue Earth; Carl M. Ostby, Erskine; P. M. Ferguson, Mankato; J. P. Keane, Pine Island; Vies Martinsen, Grand Meadow; H. P. Sentman, Fairmont; Mr. Todd; Charles Cashel, Worthington; Warren B. Clay, Hutchison; F. C. Marvin, Zumbrota, and Mr. Pfaender.

Absence of Problems An Indication of Danger Ahead

RETIRING president Charles Cashel, general manager of the Worthington (Minn.) Telephone Exchange, in the opening address stressed the fact that each previous year has brought its own problems, new conditions and situations to be faced.

"The fact," he said, "that we have met with them successfully is the key to our hope for the present and the future. The solutions of problems is the yardstick by which we may measure our progress. To have no new problem would be an omen of danger ahead, indicating that our growth and improvement had stopped—that we were no longer facing new frontiers in telephony."

Mr. Cashel stated that in order to continue to operate successfully, the telephone industry must always look to the future. "The telephone business has never been built for today only," he said, "with an eye to quick profits. It is essentially a long-term proposition, requiring long-term capital investment. Consequently it demands long-term planning, with all the foresight we can muster. We must be constantly aware of the trends in many related fields which affect us; the growth and shifting of populations; building activity; monetary relationships, and political thought. These and many other factors have a direct influence upon the conduct of our affairs."

Mr. Cashel explained that it takes years of productive service before telephone buildings, cables and switchboards wear out—yet they can become obsolete almost overnight if their ca-

pacities become inadequate due to outside causes. Neither can the rates for telephone service be always considered as constant and adequate. They are fully as subject to obsolescence as equipment, from causes over which we have no control. As certainly as prices change in unregulated industries, so telephone rates must eventually follow the purchasing power of the dollar, as it goes up or down, he added.

"Under government regulation," Mr. Cashel said, "our prices for service are not subject to constant fluctuations as are the prices of food, clothing, steel and other commodities and services. Telephone rates are generally regarded as fixed for long periods of time—not to be justifiably increased until we can prove that the need is imperative. On the other hand, our operating costs are subject to the same conditions and influences which affect other businesses, reacting very quickly to change.

"Wages, a major factor in our expense, are more and more becoming based on the cost of living for the employee rather than upon our ability to pay. Prices for materials are tied to the costs of production. Rate adjustments and approvals are usually 'ex-post facto' remedies. No company desires to run the gamut of rate changes any oftener than is absolutely necessary.

"Thus in a period of rapidly rising costs such as we have experienced during the past several years, the lag between higher operating expenses and rate relief has been extremely unfavorable to telephone companies. The converse of this is partially true—that in a period of declining costs, telephone companies whose economies are adjusted to the higher level will benefit—but only down to a certain point. I am sure that no-one in our business enjoys removing telephones . . ."

Discussing the "leveling off" period, Mr. Cashel stated it is apparent that prices have not yet reached their peak.

"Answers by economists seem to be in wide disagreement," he said. "There are, however, many indications that they will never subside to pre-war levels. The size of our national debt requires a wage scale that will support high taxes. Full employment, a continued demand for goods and services, exports to a needy world, and the long-term trend of dollar devaluation all point in the same direction. Our whole national economy is gearing itself to a plateau of high costs, and we have no choice but to follow. Telephone companies have already done their share in 'holding the line' against inflation. We must now retreat to a new stand, for our own self-preservation."

Mrs. B. Ellen Neale of the Cable Spinning Co., Topeka, Kans., and C. E. Brown, Kellogg's supply sales manager confer during Minnesota convention.

Determination of Fair Values

THERE ARE many ramifications to the acceptance of new dollar values—not the least of which involves rate-making itself. Mr. Cashel asked—"What values are to be deemed fair and reasonable, and how shall they be determined?"

"In reducing costs and investment to the common denominator of today's dollar," he said, "it must be kept in mind that the pre-war dollar bought a lot more value than the same dollar will today. The book value of a telephone company represents only the number of dollars which have been expended in plant, not the kind of dollars that are disbursed.

"Take for example two identical telephone exchanges, one of which was completely modernized just prior to the war, and the other in 1947. The latter will have a substantially higher book value, although their actual values in equipment and productive plant would be equal. Should the rates for both be based upon their book values, upon the quality of the service they render, or upon other factors? Both exchanges are subject to the same high level of operating costs. The former would be allowed less for depreciation, but the actual expense of replacing plant would be the same for both. Perhaps a reliable property appraisal could make the proper adjustments."

Mr. Cashel reviewed the question as to whether the allowable rate for depreciation is sufficient today.

"A rate of 4% contemplates a plant life of 25 years," he said. "In the course of a 'normal' Minnesota winter, any or every part of our state is subject to severe snow, ice, and wind storms. One section has had three such damaging storms in the past seven years. When this happens, the burden falls heavily upon individual operating companies. A company with its exchanges spread widely over a large area, such as the Northwestern Bell, may be able to absorb some of these costs by bringing in its own repair men from exchanges not affected by the storm. A small company has no income to cover this type of loss, except such as may be set out of its allowable depreciation. Is our depreciation expense adequate for such contingencies?"

Instability of Toll Revenues

STATING THAT the two main sources of telephone company in-

Directors of Minnesota Telephone Association met for luncheon following sessions of the convention.

come are exchange and toll revenues, Mr. Cashel said that with the large amount of toll usage and increased compensation, toll revenues are providing a much greater percentage of total income than in the past.

"Subscribers rentals," he said, "have always been considered a very stable source of income, even in times of depression. Toll revenues do not have this same stable character.

"When money is scarce, a subscriber will drastically limit his use of toll service long before he will order removal of his telephone. We can recall that most telephone people anticipated that the number of toll calls would drop off substantially after the end of the war, with soldiers returning home and the demands of war production over.

"Not only has this reduction failed to materialize,, but almost monthly toll usage has reached new highs. This seems to prove, as pre-war reductions in toll rates indicated, that there is a direct relationship between toll usage and the amount of toll charges. The effect of rapidly rising prices and wages in other industries, while toll rates remained constant, has amounted to a virtual reduction in toll rates. Comparatively, toll is much cheaper than ever, and its use is increasing proportionately. As toll usage is very sensitive to general business conditions, it can be expected to also drop rapidly in the event of a recession. Compensatory revenues from increasing exchange rates would be impossible to obtain at the time it might be needed, due to the same prevailing conditions which caused the loss of toll business. Therefore, this instable toll factor should be carefully considered by both regulatory bodies and telephone companies when setting up new rates."

In his closing Mr. Cashel reviewed activities of the Minnesota Association.

He stated that Jack Crowley, secretary of the Minnesota association, had since the end of the war, assisted over 100 of approximately 230 Minnesota B, C, D and E companies in obtaining rate increases. 1947 was the banner year, with 67 applications filed by Independent companies in the state. Of these, 60 had been approved by January first, and 7 were awaiting further consideration. Last year's increases amounted to $321,369.00 in annual revenues.

Following president Cashel's address, Hon. Joseph Ball, United States Senator of Minnesota presented an interesting discussion of national affairs. Senator Ball was followed by John H. Agee, chairman of the Em-

Minnsesota conventioners pause for group discussion. LEFT TO RIGHT: John H. Agee, P. M. Ferguson, Warren Clay, P. M. Ferguson, Jr., Ray W. Smith and J. C. Crowley Jr.

ployment Relations Committee, United States Independent Telephone Association, and vice president and general manager of the Lincoln (Neb.) Telephone & Telegraph Company.

AT THE OPENING session on Tuesday, R. W. Hayes, traffic manager of the Northwestern Bell Telephone Company, Minneapolis discussed "The Completed Call." Mr. Hayes stated that every minute of every day the Independent and Bell companies are called upon to act jointly as a team toward an identical end—that of making it possible for two people to talk together wherever they may be.

"The telephones," he stated, "that the industry serves are inter-connected and so the responsibilities, the problems, and the progress of the different units of the industry are closely interwoven. The only way that we can serve our mutual customers in Minnesota efficiently and continue to serve them better as the years go on is by working, thinking and planning together on all of our common problems.

"It goes without saying that the completed call is our only stock in trade—the only merchandise we have to sell. From the standpoint of our customers this is a most significant measure of service value."

Mr. Hayes states that just prior to the war completions of both local and toll calls had been brought up to a very respectable level. In St. Paul the Northwestern Bell was completing better than 81 per cent of local calls and nearly 92 per cent of toll calls.

"We are all too familiar," he said, "with what happened during the stress and strain of the war years and the years just following. Using St. Paul again, our local completions dropped from 81 per cent down to 74 per cent last year. In other words, we were delivering on only about three out of four orders. Toll completions were off from 92 per cent to 80 per cent, or we dropped from about nine deliveries out of 10 orders to only about 8 out of 10.

"Putting it another way, the quality of our merchandise deteriorated considerably. In addition a revenue source was severely depreciated. It has been estimated that an improvement of three per cent in the toll completions in the Northwestern Company territory is worth about one million dollars annually in revenue in which we would all share. This was not entirely the industry's fault. In fact you don't need me to tell you that actually a magnificent job was done by all units of the industry to complete calls under the staggering difficulties imposed by war conditions. We have ample evidence that both the public and the government recognized that fact. But the war has been over for two years. Improvement of service today is the thing the public needs and the goal toward which we are mutually working."

Mr. Hayes presented some of the measures that the Northwestern Company are planning to take to improve completions. He explained that in 1947 Independent and Bell toll calls reached a daily average of about 87,000, which was about 9 per cent higher than the 1946 level. From the best estimates available this daily average of offered toll calls may rise to around the 92,000 mark in 1948 or an increase of about 6 per cent. About 22 per cent of the total offered toll busines in

Registration desk at Minnesota convention was busy spot. LEFT TO RIGHT: Miss W. E. Motzko, sec. to J. C. Crowley, Jr.; Miss Ackerman and Miss Schneider.

Minnesota in 1947 originated at Independent offices. Completions on these calls ran about 95 per cent in 1940 and about 91 per cent in 1947.

"Obviously," he said, "one of the first considerations for improving toll completions, particularly when a substantial increase in offered calls is expected, would be the addition of more toll circuits. We expect to add about 361 circuits all told in Minnesota as compared to 310 in 1947 and 135 in 1946. Of the total to be added in 1948, 194 will involve your exchanges."

Mr. Hayes stated that Northwestern Bell expects to complete the Minneapolis-Des Moines coaxial cable around June of 1948. The company also expects to complete the Minneapolis-Sauk Centre "K" carrier cable this spring. The work of burying cable was completed last year and only the work of cutting in the terminal equipment and repeater points remains. This system requires two cables to handle 12 simultaneous messages in each direction.

Competition For Consumers' Dollar

MR. HAYES said that a period of intense competition for the consumer's dollar may be fairly close irrespective of whether prices rise or income falls. For nearly six years there has been no effort to make people want telephone service, either local or long distance.

"In fact," he said, "for a considerable part of that time the effort was to get them to use less of it and not more. Evidence that this restrictive type of advertising lives a long time is given by the fact that in a survey of public opinion carried on last summer 57 per cent of the persons queried remembered advertising limiting long distance calls—altho most of this advertising was done during the war and there had been none of it in national magazines for two years.

"With competition for the consumer dollar expected to get tougher, it does not seem wise to urge people to be brief or to place any limitation on the use of telephone service. For there will come a day when we will not care how long they talk, and we will be urging that they talk for longer periods." Mr. Hayes suggested a number of good advertising themes for consideration when the time becomes right to use them; the story of how cheap long distance service actually is. Most people guess about 40 per cent too high when asked the price of a call; advertising designed to establish the low cost of typical three-minutes calls might do more than merely increase business.

"It might help," he said, "to balance some of the criticism of increases in local rates. In addition, the increased use of long distance would serve to point up the need and value of the telephone in the home or office. Frequently a long distance call is a dramatic and spectacular example of this value.

"I don't want to pursue this point too far, nor do I wish to create the impression that we are starting out on a promotional campaign while we are still having difficulty handling present business. But I am sure that the years of practical operating experience represented in this group have taught you that the pendulum always swings as far in one direction as in the other, and that today is a good time to be thinking and planning for the trends that will surely develop tomorrow."

Pointing out the importance of local completions, Mr .Hayes outlined some of the specific practices that the Northwestern Bell is considering with the idea of improving the per cent of calls completed, both toll and local. Among the practices presented were:

(1) Careful study by the manager and chief operator of the facilities and usage habits of customers. Such studies reveal excessively busy lines which present sales opportunities for more lines; show up cases of non-consecutive lines which could be grouped for easier handling; reveal customer lines where the called party may frequently fail to answer, and indicate situations where the calling party does not wait long enough for the called party to answer.

(2) Study abandoned calls to see if operating errors or irregularities may have caused or contributed to the failure to complete.

(3) Analyze the interval at which "Don't Answer" reports are given to the calling party. Such studies often disclose the fact that operators are not waiting long enough in giving out these reports and are adding to completion failures.

(4) Many causes of uncompleted calls lie outside the operating room and can best be attacked by plant and commercial forces. For example plant trouble accounts for many completion failures in dial offices and is also a source of uncompletions in manual exchanges.

Mr. Hayes stated that advertising and interviews with customers designed to sell them on the ideas of answering telephones promptly and to wait a reasonable length of time for the called party to answer will help materially to improve completions.

"We find," he said, "that the attitude of the individual operator has a tremendous effect upon completions. A recent analysis in 12 cities showed that 75 per cent of all toll calls cancelled were caused by 'busys', 'don't answers', and 'called party not in.' All of these items lie within the operator's discretion to attempt to remedy. A great deal of our supervision is directed to building up the right frame of mind to teach attentiveness, distinct speech and to build up an interest in completing the call. During the war years we encouraged customers option to cancel calls by inquiring 'Shall I make further attempts'. We now approach a failure to complete by telling the customer 'I will try your call again.'

"It has been our experience and I am sure yours also, that completion of toll calls is best assured if the calling party is held on the line while the first attempt is being made, but when this does not occur the next best thing is a definite time when another at-

(*Please turn to page* 50)

PRACTICAL--

"HOW TO DO IT"

SUGGESTIONS...

•

by

MYRLE SHAFER

•

NEW CONNECTOR SUITED FOR C. O. GROUNDING . . .

THE BURNDY Engineering Company of New York recently brought out a cross-groove design ground connector (See Fig. 1) which is well suited to central office ground-

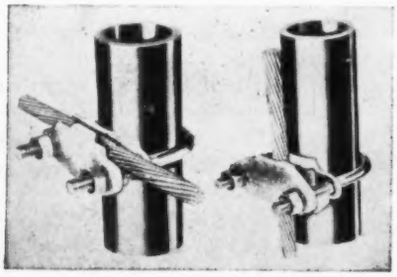


Fig. 1—New cross groove ground connector suitable for attaching ground cable to pipes.

ing purposes. Multiple pipe grounds have long been popular for the central office ground. However, they are always subject to the problem of getting a satisfactory connection between the pipes and the ground cable. The Burndy connector would seem ideal for making this connection as it can be used with the ground cable either parallel to the pipe or at right angles as is shown in the illustration. Another advantage is that it can be placed over the pipe even though the top is badly mushroomed as the result of being driven into the ground.

• • •

CROW'S NEST SPEEDS UP CABLE OPERATIONS . . .

CURRENTLY high labor costs make tree trimming an outstanding "headache" to plant managers. Some use is being made in the power field of a "home made crow's nest" type of elevated workman's platform. It can be used in conjunction with any large construction truck. It consists essentially of a gin pole supported platform which is raised and lowered by winch power. The floor of the working platform is maintained level by an arm which extends from the crow's nest platform and which has a tie cable attached to the floor of the truck. The spacing of the boom arm and tie cable is such as to form a parallelogram as shown in Fig. 2.

In tree trimming, two men can work from this elevated cage which can be brought in close to the limbs that are to be cut off thus enabling the use of short tree trimmers which can be handled much more rapidly than can tree trimmers from the ground. When using this type of device great care must be taken that accidents do not occur due to moving the truck when the unit is elevated. Particular caution should be exercised when working around high voltage power wires.

• • •

WINTER TREE TRIMMING SIMPLIFIES OLD PROBLEM . . .

THE ADVANTAGES of providing for proper wire and cable clearances from trees, particularly in city plant, during the winter season is often overlooked. It is considerably easier and better to trim trees when they are not in foliage and usually there are fewer objections on the part

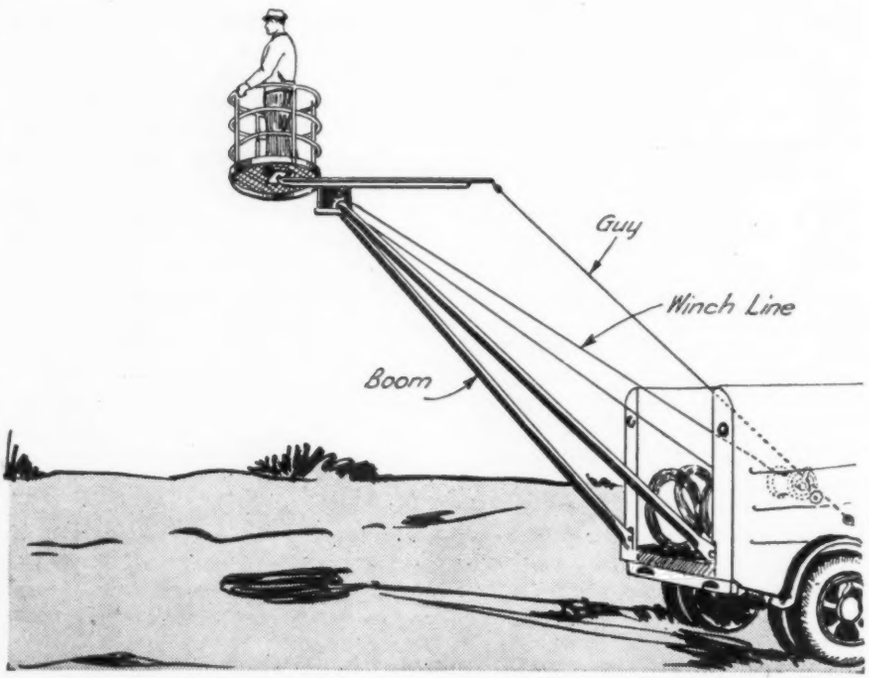


Fig. 2—Homemade elevated working platform.

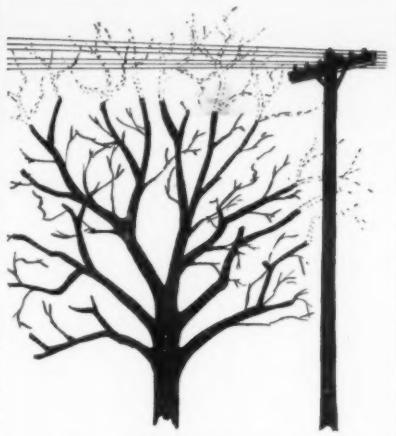


Fig. 3—Trimming back to lateral branches.

of property owners. Even the problem of disposing of the trimmed limbs is simplified in the winter, particularly in the smaller towns where property

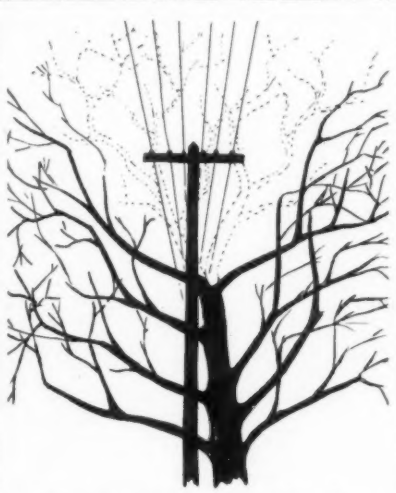


Fig. 4—Creating a "wire channel" through large trees.

owners are often glad to have the trimmed limbs for fuel purposes.

Unless the trimming is handled by a commercial tree trimming company, adequate supervision should be given the men doing this type of work by the plant manager to avoid the bad public relations that result when trees are improperly trimmed. Fig. 3 illustrates how a tree which is growing directly into the line can be cut back to the lateral branches without adversely affecting the appearance of the tree and thus giving ample clearance for several growing seasons.

Fig. 4 illustrates how a tree which has been allowed to grow up into and through the lead can be trimmed or opened up to make a wire channelway, yet permit the tree to grow around and above the surrounding wires. These are typical of the many situations encountered in tree trimming, and good judgement on the part of the supervisor is required to avoid getting in bad with property owners. Fig. 5 shows several features of tree trimming that are important.

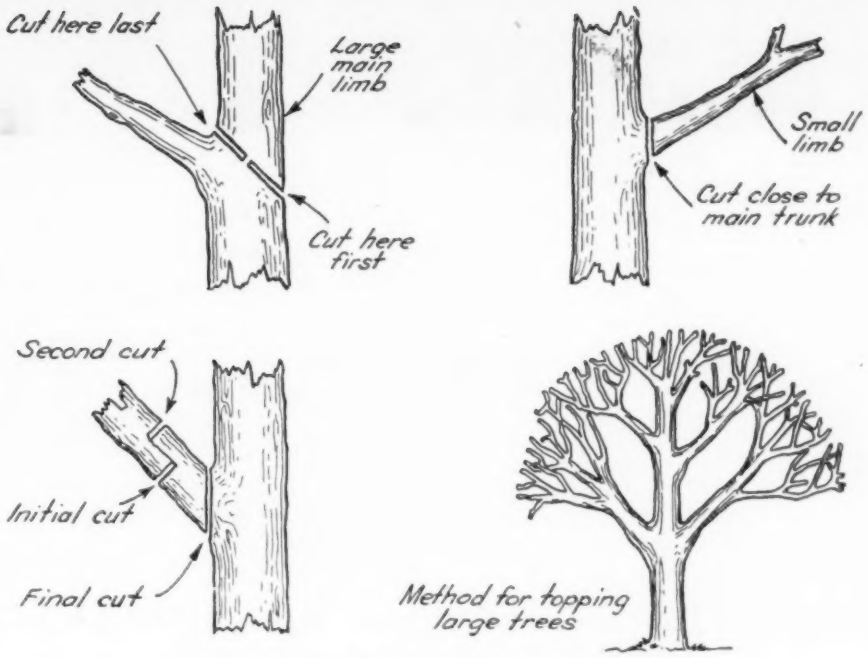


Fig. 5—Various features of tree trimming.

• • •

UNIQUE MAGNET CHARGER REQUIRES NO EXCITING CURRENT . . .

A NEW TYPE of magnet charger that requires no exciting current for its operation should be of interest to operating telephone companies. Magnet chargers are useful in the telephone repair shop for recharging the permanent magnets in ringers, receivers, and telephone generators. Components which might otherwise need to be thrown away can often be restored to usefulness by simply recharging the permanent magnet.

The new magnet charger consists of a powerful horseshoe shaped magnet of Alnico-B. This is a very high field strength magnetic material and provides sufficient magnetic force to do an excellent job of re-magnetizing permanent magnets. The "weak" magnet to be recharged is merely placed across the two pole pieces (See Fig. 6) which are adjustable and then rocked back and forth which tends to bring about magnetic saturation. The pole pieces are slotted and the air gap can thus be adjusted to accomodate the various type magneto commonly used in the telephone field.

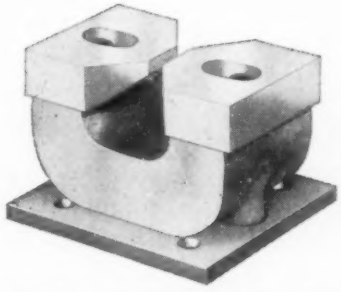


Fig. 6—New magnet charger useful for recharging permanent magnets in ringers.

• • •

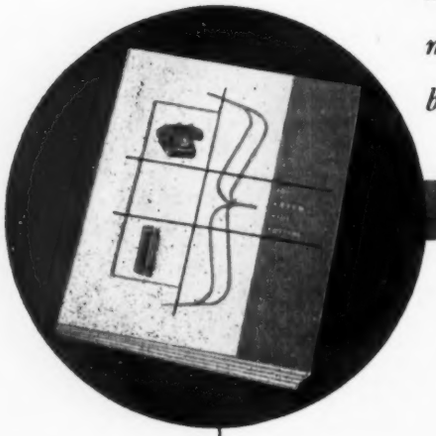
POWER COMPANIES ACTIVE IN OBTAINING RADIO LICENSES . . .

A RECENT analysis of the utility radio service and special emergency service radio licenses and construction permits granted to power and petroleum companies show that these interests are very active in making full use of mobile radio service. These represent companies that have seen fit to set up their own radio service rather than to take it from the local telephone company. As of November 30 there were over 439 utility and petroleum companies that are either already operating or have construction permits. This is an increase of approximately 180 over the same time in 1946.

The apparent value of mobile radio service in the utility field is shown by the large number of power companies, either now making use of it, or contemplating its use. This emphasizes the need for telephone companies, that expect to serve the mobile radio needs of their communities, for drawing up plans at an early date and getting together with the power company in an effort to make a single *general* mobile service take care of the requirements of all the various firms in a

THE NEW LEICH DIAL SYSTEM

This is the most simplified dial switchboard you've ever seen. It has fewer, less complicated parts and less to get out of order. With this Leich Dial System you can convert to dial faster, with less expense and less trouble. Any good telephone man can learn to operate and maintain it. All parts, including lines and links, are jacked in. You can't make a bad guess about future expansion. No matter how large you grow, the original equipment can be added to with a minimum of expense, time and trouble. All this may sound almost too good to be true, but it most certainly is. The literature described below gives the complete story.

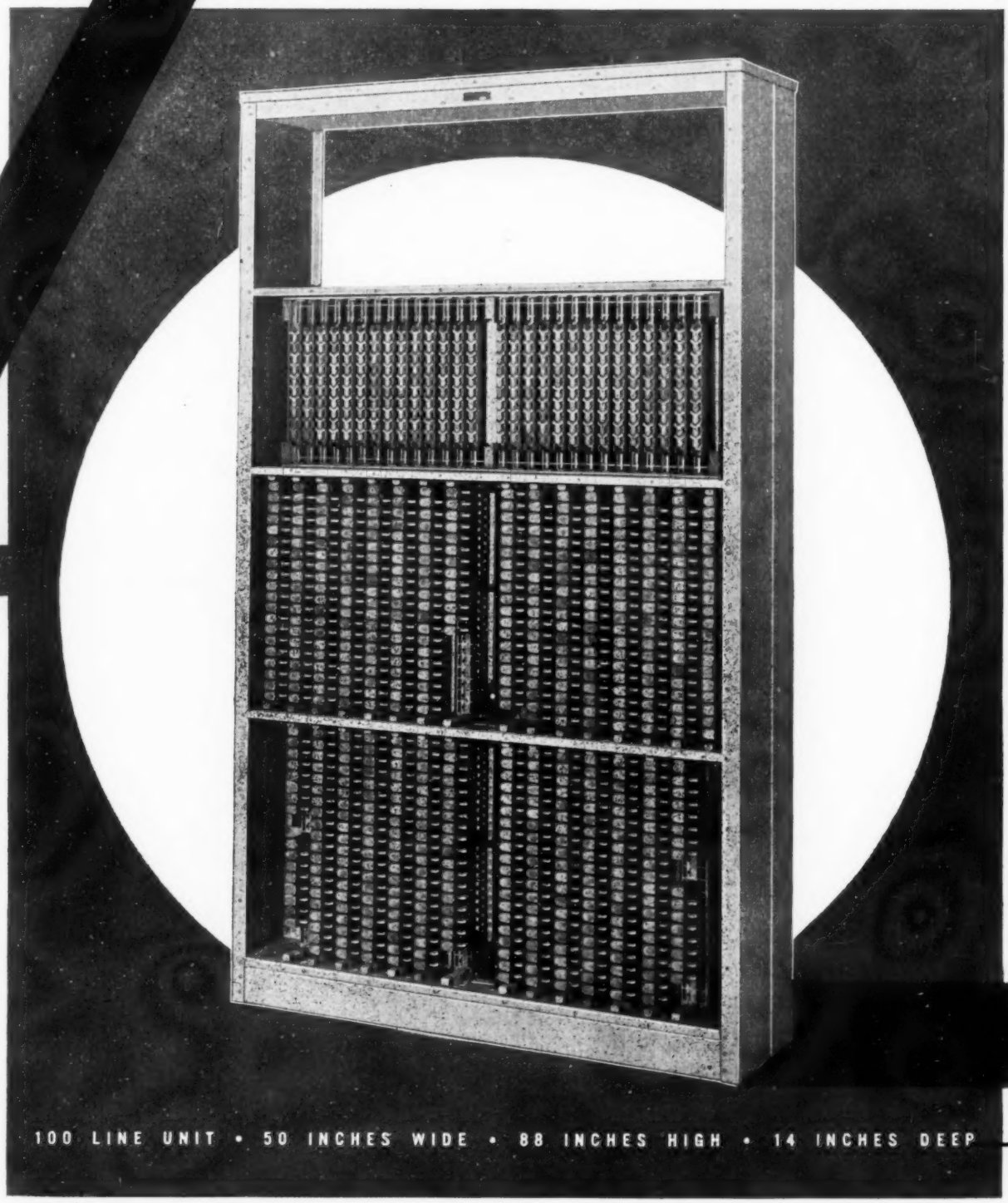


COMPLETE INFORMATION NOW AVAILABLE

A 20 page illustrated catalog, which describes the new Leich Dial System in complete detail, is now available. Send for your copy today. No charge or obligation. Leich Sales Corporation, 427 West Randolph Street, Chicago 6, Illinois.

Leich MANUFACTURERS OF TELEPHONES, SWITCHBOARDS AND RELATED APPARATUS SINCE 190

a better, easier way for the smaller exchange to convert to dial



100 LINE UNIT • 50 INCHES WIDE • 88 INCHES HIGH • 14 INCHES DEEP

★ Free Literature Department ★

All literature described in this department may be obtained by filling out the handy blank at the bottom of this page and forwarding to Telephone Engineer Publications.

Cutters: Folder issued by H. K. Porter, Inc., describes complete line of redesigned Porter hand power cutters; recommends cutter that should be used for each kind of job. Request FL 175.

• • •

Gas Furnaces: Catalog T999, released by the Mutual Liquid Gas Equipment Co. describes complete line of Mutual's liquid gas field equipment. Request FL 176.

• • •

Management: Ninety eight per cent of all the businesses in the United States are in the small business group. The problem of any small business is how to keep abreast of the latest and most effective means of operating and controlling the various phases of the enterprise. To aid management in making a self-analysis of its efficiency, a checking chart of the fundamentals in production, distribution, finance and management has been developed .Copy will be sent to those interested. Request FL 177.

• • •

Profit Sharing Plans: Description of plan employing new principles of dividing profit with labor has been developed by Freeland, Bates & Harris Inc., management engineers. The plan resulted from survey made of plans currently in operation and is flexible enough to be made to apply to any business. Description of plan, available without charge or obligation. Request FL 178.

Recorders: New catalog released by Magnephone Division of Amplifier Corp. of America provides information on complete line of Magnetape recorders and description of newly—developed voice—activated clutch which makes the instrument suited for any regular, occasional or intermittent sound recording requirement. Request FL 179.

• • •

Telephones: Catalog recently released by Leich Sales Corporation fully describes new telephone instrument now available to the Independent industry. Main feature of the new Leich telephone is that the same telephone serves as a desk or wall model. Request FL 180.

• • •

Trucks: The Four Wheel Drive Auto Company has released a small pamphlet entitled "Added Traction On The Job." The folder illustrates several models of FWD utility trucks and other utility equipment manufactured by the company. Request FL 181.

• • •

Wood Preservatives: Booklet issued by Chapman Chemical Co. tells the story of modern chemistry's part in making wood last longer. All users of wood products will appreciate this valuable informative booklet. Request FL 182.

Date.....

TELEPHONE ENGINEER PUBLISHING CORP.
7720 North Sheridan Road,
Chicago 26, Illinois.

Please forward the following literature described in the Free Literature Department of the February, 1948 issue of TELEPHONE ENGINEER AND MANAGEMENT: (Check information desired)

FL 175..... **FL 176**..... **FL 177**..... **FL 178**.....
FL 179..... **FL 180**..... **FL 181**..... **FL 182**.....

Name: ..... **Title:** .....

Company: .....

Street Address: .....

Town: .....**Zone:** .....**State:** .....

community with the possible exception of the taxicab interests. It is plainly a time for telephone companies to take the initiative.

• • •

USEFUL TEMPERATURE-GRAVITY CONVERSION CHART . . .

AS THE temperature of storage battery electrolyte increases above 77° F (the base value), the specific gravity readings are actually higher than those shown on a hydrometer. Conversely, as the temperature decreases below 77° F the specific gravity readings are lower than those shown. A corrective factor is therefore applied by battery maintenance men to get the correct reading.

The corrective factor consists in adding to the hydrometer reading one point for each three degrees rise above 77° F, and subtracting one point of gravity for each three degrees below 77°. For example, a reading of 83° F would require two points of specific gravity to be added to the normal reading. If the hydrometer read 1.210 and the temperature was 83° F, the corrected reading would be 1.210 plus .002 or 1.212.

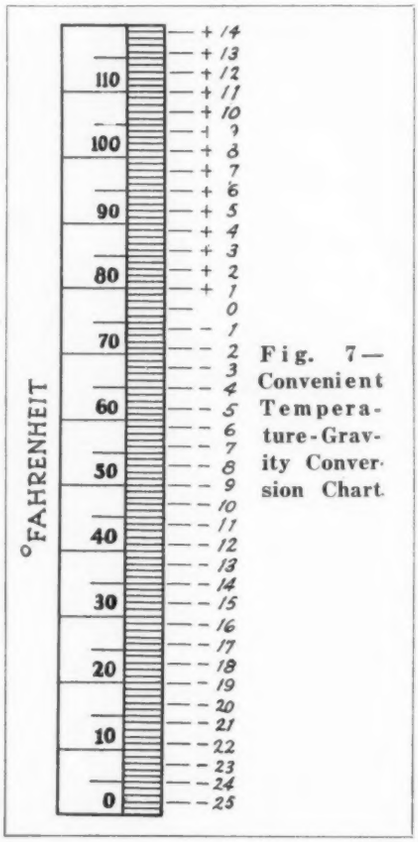


Fig. 7—Convenient Temperature-Gravity Conversion Chart.

The conversion scale shown in Fig. 7 is useful in quickly determining the number of points to be added or subtracted from the hydrometer reading. This conversion scale can be cut out and pasted on cardboard and hung near the batteries for convenient reference purposes.

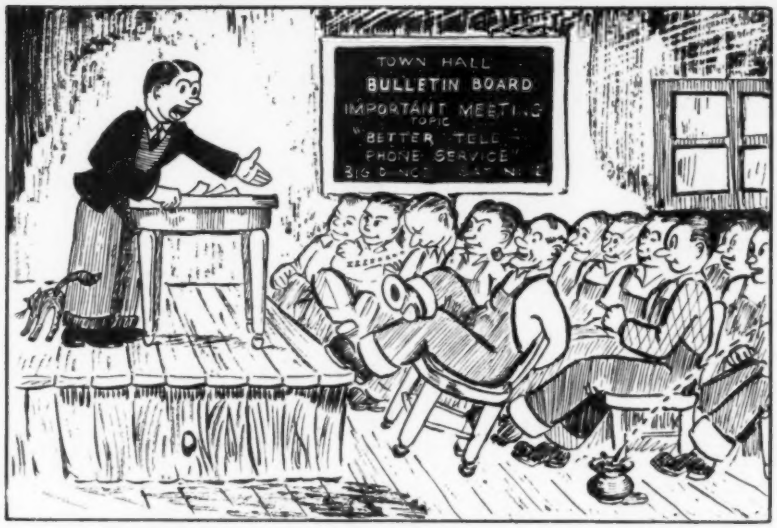


Fig. 1—Mutual Line Subscribers should be encouraged to take more interest in their lines.

HELPING THE MUTUAL COMPANY

TELEPHONE companies serving mutual lines should encourage improvement projects. Proper program results in better service for all types of subscribers.

ALTHOUGH the "mutual" or farmer-owned type telephone lines are gradually disappearing from the picture, there are still many thousands of stations operated on this basis. Telephone companies serving mutual lines can adopt one of two policies, namely: (1) Let the mutual lines shift for themselves and when complaints are received because of poor telephone service as the result of poorly maintained mutual lines, the blame can be put on mutual lines; or (2) the telephone company can take a helpful initiative by keeping the mutual company subscribers interested in their lines and encouraging them to maintain their lines in good condition.

Needless to say, in the interest of good telephone service in a community, the latter method is recommended. Many of the mutual lines are badly disorganized. In many cases they have no one responsible for line maintenance, or any plan for collecting funds for the repair of lines.

The first step towards improving the service of a mutual line is to get the subscribers to hold a meeting to consider ways and means for improving service. Some one from the telephone company should appear and talk to them regarding the need for a better organization and for the collection of funds for line rehabilitation and yearly maintenance. Once, a group of farmers get enthused about a project, they will usually throw themselves into it and can be expected to work hard to bring about improvements.

One good way to sell the owners of farm lines on better telephone service is to stress the value of a telephone from an emergency standpoint alone. Point out the fact that a single call during a sickness emergency may mean everything to a subscriber. Unreliable, hit and miss service may not work at the time it is badly needed. Prior to appearing at a meeting, drive over the lines and make a rough estimate of what is needed and have this information available for presentation to the group when they are called together. If feasible, offer to assist them by supervising the repair and restoration of their lines to good usable condition. Suggest that all farmers on the line contribute so much time and money toward effecting the necessary repairs. Your extra effort in helping to bring about an improvement in mutual line service will pay for itself in the overall improvement which results in a community which has a reliable service for all types of subscribers mutual or otherwise.—THE END

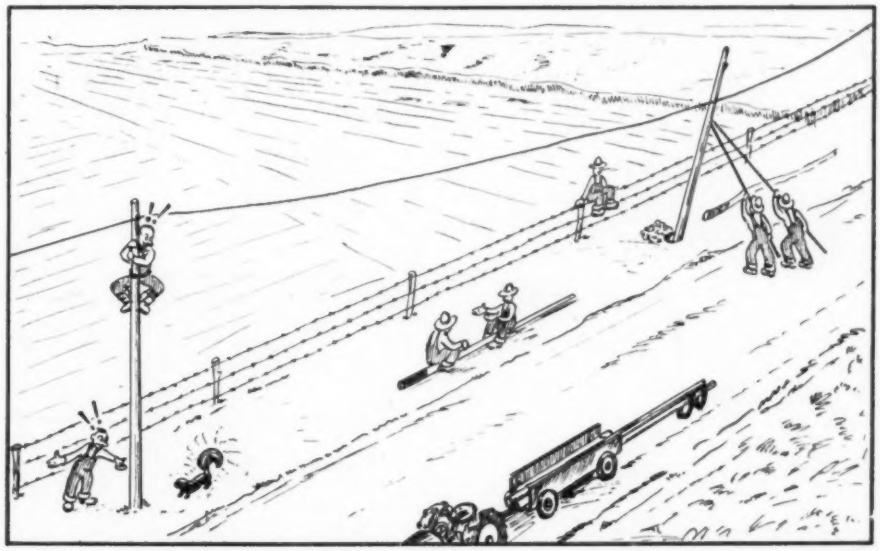
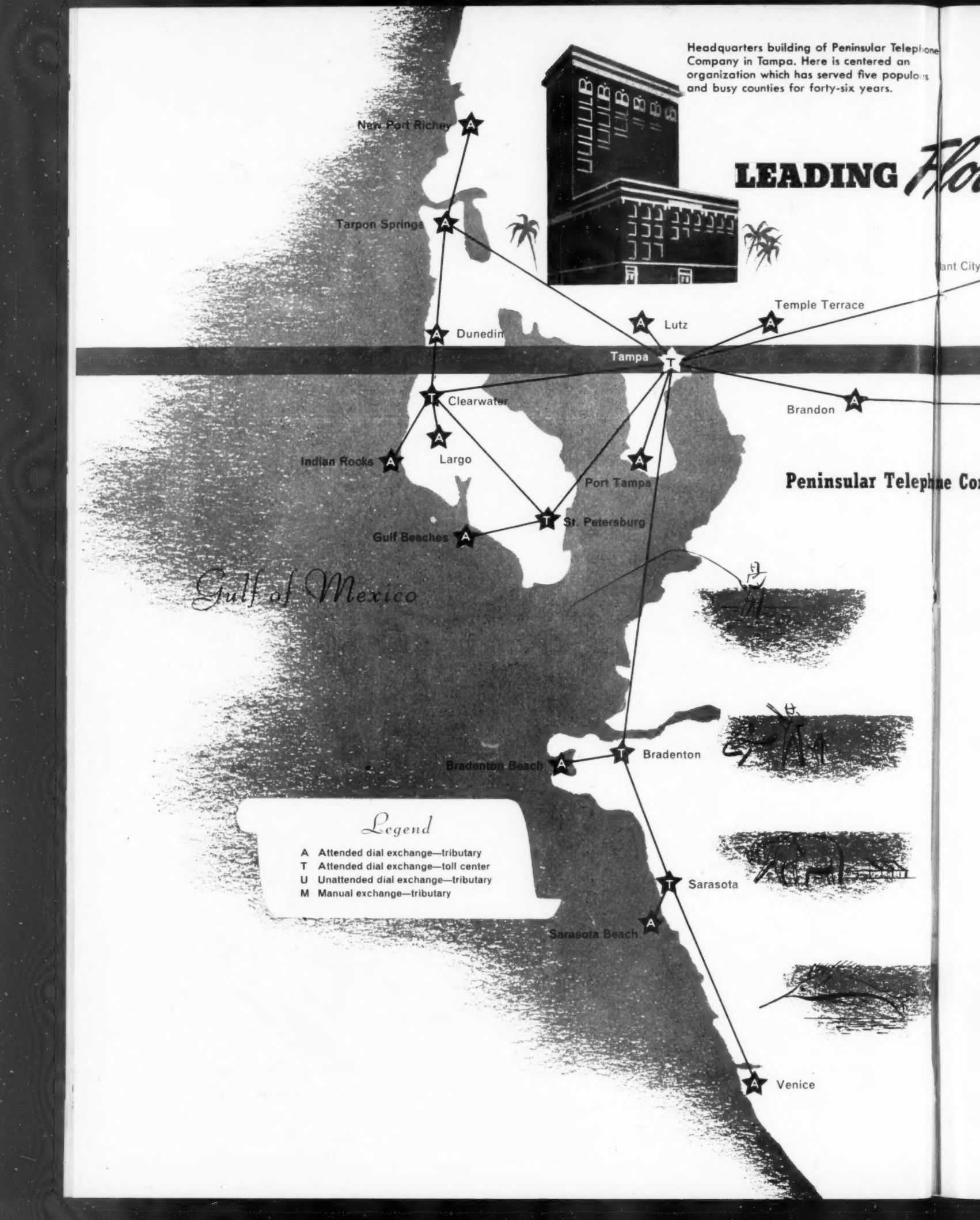
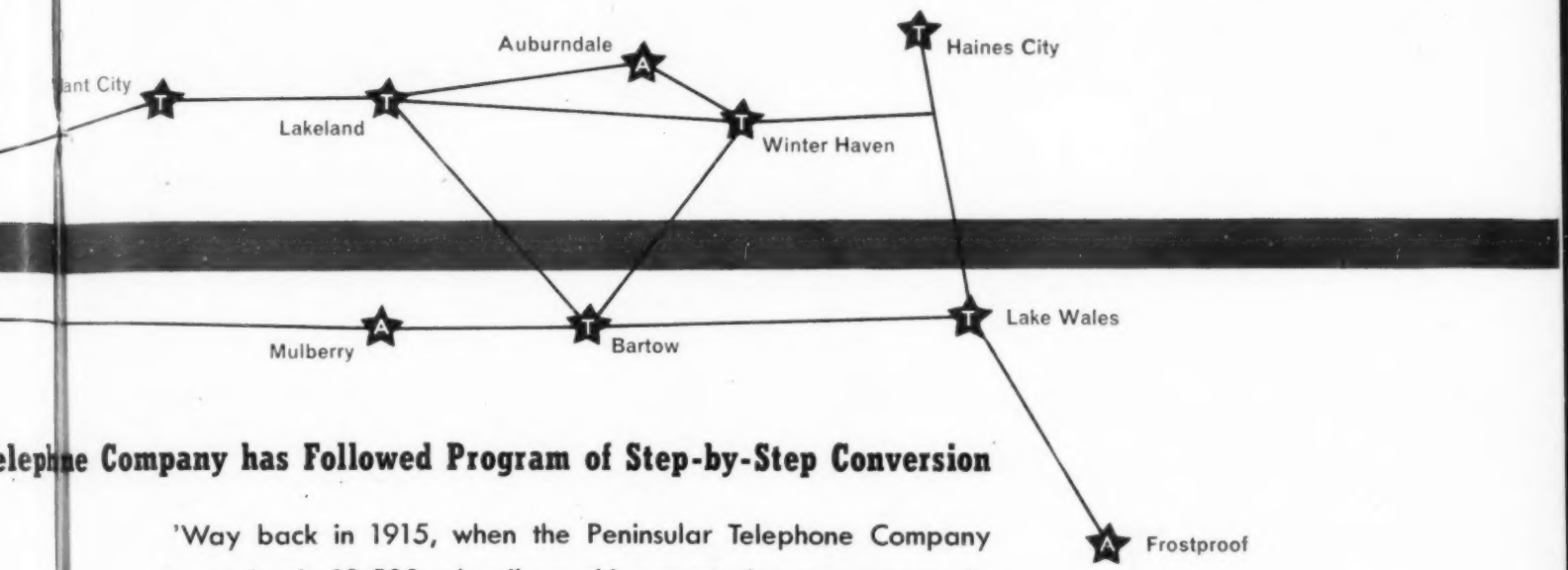


Fig. 2—Cooperative pooling of effort can accomplish wonders in a few days in the rebuilding of worn-out open wire lines.


Headquarters building of Peninsular Telephone Company in Tampa. Here is centered an organization which has served five populous and busy counties for forty-six years.
LEADING Flo
Peninsular Telephone Co
New Port Richey
Tarpon Springs
Dunedin
Lutz
Temple Terrace
Tampa
Clearwater
Brandon
Largo
Indian Rocks
Port Tampa
St. Petersburg
Gulf Beaches
Gulf of Mexico
Bradenton
Bradenton Beach
Sarasota
Sarasota Beach
Venice
Legend
A Attended dial exchange—tributary
T Attended dial exchange—toll center
U Unattended dial exchange—tributary
M Manual exchange—tributary

Florida NETWORK NOW 100% AUTOMATIC

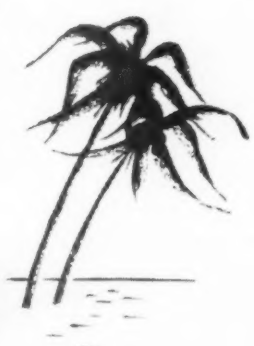


elephone Company has Followed Program of Step-by-Step Conversion

'Way back in 1915, when the Peninsular Telephone Company served only 13,500 subscribers, this progressive company made its first purchase of Strowger Automatic equipment. Now serving 107,000 subscribers, its network is 100% automatic—and Automatic Electric is proud of its contribution to making the Peninsular Telephone Company one of the largest and most progressive Independent telephone companies.

Through all its years of growth, this leading Florida company has followed a progressive program of step-by-step conversion to automatic operation. More than twenty-five years ago, automatic toll switching was introduced into its network; today, inter-toll automatic dialing is used between all exchanges which are connected by direct circuits—and, on a tandem basis, between all automatic toll centers.

Modern automatic service has been a major factor in the success of the Peninsular Telephone Company. Let us show you how Automatic Electric equipment can serve YOU!



AUTOMATIC ELECTRIC

Originators and Developers of the Strowger Step-by-Step "Director" for Register-Sender-Translator Operation . . . Machine Switching Automatic Dial Systems

Makers of Telephone, Signaling and Communication Apparatus . . Electrical Engineers, Designers and Consultants

Distributors in U. S. and Possessions

AUTOMATIC ELECTRIC SALES CORPORATION, 1033 W. Van Buren St., Chicago 7, U. S. A.

Export Distributors: INTERNATIONAL AUTOMATIC ELECTRIC CORPORATION

Current COURT and COMMISSION Activities

Rate Increase Approved For Amboy, Minnesota

The Willow Creek Telephone Company, which serves Amboy and Vernon Center, Minnesota, with 265 local and 488 rural stations, recently was granted increases in rates of from 25 cents to $1.25 by the Minnesota Railroad & Warehouse Commission.

The rate increase becomes effective, the commission said, as soon as the company puts into effect $3,771 salary increases for its employes.

◆

Rate Boost for Strum (Wis.) Tel. Co.

Rate increases for the 300 subscribers of the Strum (Wis.) Telephone Company have been approved by the Wisconsin Public Service Commission. A commission order explained that the company operated at a loss in 1946 and 1947.

◆

Careless "Cussers" Censored By Commission

The Illinois Commerce Commission has reiterated a previous ruling allowing telephone companies to stop foul or profane language over telephones.

Under the ruling the company is authorized to remove a subscriber's telephone if he "doesn't watch his language." The order was issued in an action by the Lookingglass Prairie Telephone Company which serves Muscoutah, Illinois and six surrounding communities.

◆

Colorado Court Dismisses Suit Against Rate Boost

District Judge G. Russell Miller has sustained a motion to dismiss a suit against the Mountain States Telephone and Telegraph Company which asked the court to nullify the action of the City Council of Colorado Springs, Colorado, on November 12 granting a $211,480 increase in telephone rates.

The suit filed December 10 also asked that the company be ordered to refund all charges already collected in excess of rates formerly charged.

Although the suit was dismissed on the grounds that the complaint did not state an adequate basis for action against the company the decision, in effect, sanctioned the telephone rate hike.

The plaintiffs were granted 30 days in which to file an amended complaint. Attorneys said they would appeal the case to the state supreme court and higher if necessary.

Basis of the suit was a Colorado Springs city charter provision requiring the City Council, when it sits as a public utility commission, to regulate rates by means of an ordinance. In this instance it was claimed, the council passed a resolution approving the rate increase. The plaintiffs also pointed out that a 1920 ordinance required that no public utility rate changes could be made without the consent of the council and the charter provided that any action in such matters by that body could be made only by means of an ordinance.

Attorneys representing the telephone company, had previously contended that under previous court rulings, a utility such as Mountain States Telephone & Telegraph Company had the right to initiate any rate changes. The attorney claimed that this being true, it made no difference whether the council resolution approving the rate increase was valid or invalid.

◆

"I say, old Chap, is he robbing the mail or did he forget a deduction on his income tax?"

Wyoming Commission Approves Toll Charge Boost

A new schedule of intra-state toll charges went into effect January 14 under a Wyoming Public Service Commission order permitting the Mountain States Telephone & Telegraph Company to increase and reduce some of its long-distance rates. The new rates will net the company approximately $45,000 annually.

George I. Redhair, state manager of the telephone company, explained that the $45,000 additional income anticipated from the new toll charges on calls made within the state is part of the $287,000 limitation set recently by the Commission in authorizing the company to increase intra-state toll and local rental or service charges for use of facilities.

Mr. Redhair said that under the new toll tariff short haul call charges are increased and long haul calls generaly reduced.

The maximum increase on short haul station-to-station calls distances of 16 to 122 miles for three minutes is 10 cents. On three-minute station-to-station long haul calls, 122 miles to 474 miles, reductions ranging from

five cents to as much as 55 cents are made. The 55-cent cut occurs on station-to-station calls made over distances of 439 to 474 miles.

The new tariff also provides changes in intrastate rates for person-to-person, night and Sunday calls.

In addition, the new intrastate toll tariff establishes a uniform base time of three minutes for all calls regardless of distance. Under the old schedule calls up to a distance of 28 miles had a five-minute base time, while calls over that distance had a base time of three minutes.

◆

Rate Increase Approved For Rhinelander, Wisc.

The Rhinelander (Wisc.) Telephone Company was recently authorized to increase monthly rates 25 cents to $1.25, depending upon the type of service received.

Increased operating costs necessitated the increase in rates, the company had informed the commission at a hearing held in Madison December 12, 1947.

In its application for the rate boost, the Rhinelander company pointed out that it was the first time since 1923 that the company had asked for an increase—despite the fact that there had been a marked increase in expense of operation during the years. A wage boost granted last May left no alternative but a rate increase, it was pointed out.

The new rates will provide less than the total annual increase in wages by about $1,150, the company stated. The wage boost amounted to $28,487.41 annually, while the new rate boost will produce only $27,344.28 of this amount, the company explained.

◆

New Owner For Blakesburg (Ia.) Exchange

The Blakesburg (Iowa) Telephone Company has been sold by Mr. and Mrs. Jacob Huber to Dale Sasseen, of Packwood, Iowa.

The Blakesburg company was organized in 1902. The first officers were Herman Snow as president, and other stock holders were Noah Smith, Frank DeHaven, Walter Abegg, and David Jay.

◆

Kentucky Court Upholds Denial of Service

The Cincinnati & Suburban Bell Telephone Company not only is warranted in cutting off telephone service where it is used for unlawful purposes, but is required by law to withdraw service from violating subscribers, Judge Joseph H. Woeste ruled in Common Pleas Court, Covington, Kentucky.

Judge Woeste declined to enjoin the telephone company from refusing to service a telephone after police charged use of an unauthorized extension.

◆

Sale of Five Companies Approved by Commission

The Minnesota Railroad & Warehouse commission has approved sale of property owned by five Independent telephone companies.

The Donaldson (Minn.) Telephone Company was authorized to sell all of its properties to Clarence F. Thompson.

Eastern Farmers Telephone Company, in Douglas county, was authorized to sell to Midwest Telephone Company its service in the village of Miltona. The Clements (Minn.) Telephone Company was authorized to sell its equipment to Joe Veran.

In a fourth action, the Park Region Mutual Telephone Company, in Ottertail county, was authorized to sell its properties in Austed township to the

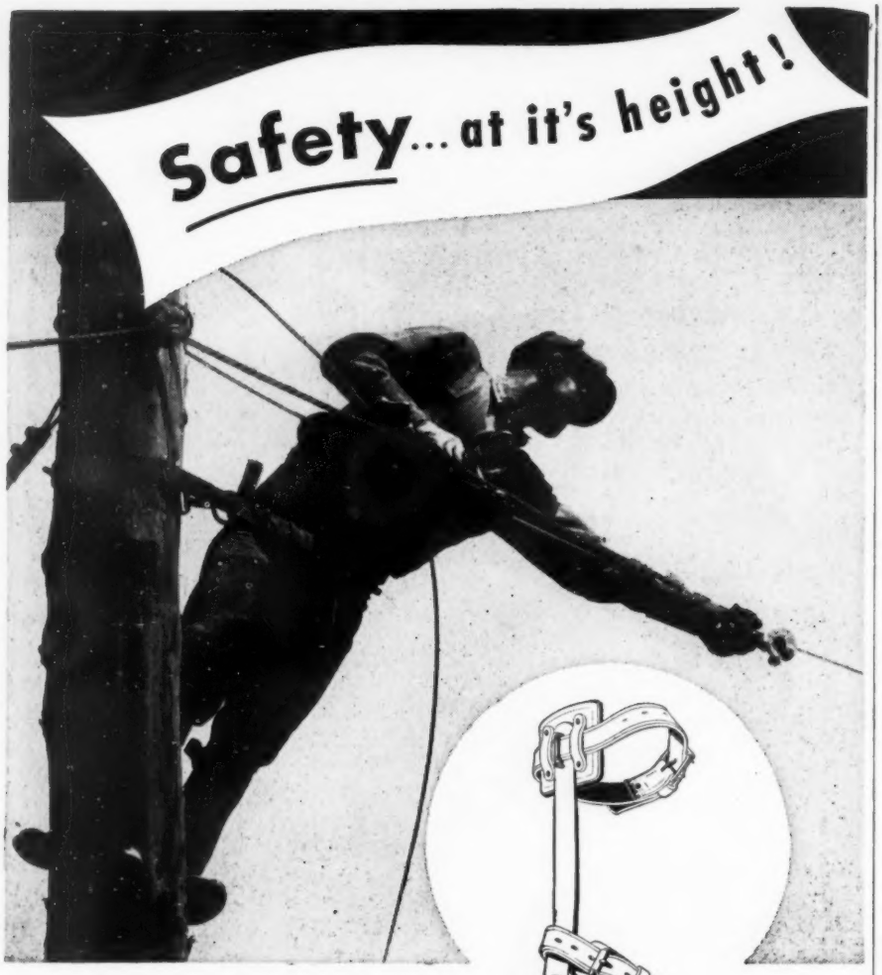
Time to Move Ahead

As operating costs and equipment investments rise, management seeks new sources of revenue. For almost a quarter of a century, Loomis has provided such additional revenue through greater directory advertising sales.

It's time to move ahead...time to utilize this experience. Bring Loomis into your picture...now!

Loomis ADVERTISING COMPANY

Gettle Bldg.
FT. WAYNE, INDIANA
KANSAS CITY, MO. ST. LOUIS, MO.
UPPER DARBY (PHILA.), PA. OMAHA, NEBR.



For more than 45 years the famous STEPHENS Climbers have been exclusively manufactured by

Buckingham
of Binghamton

and in that time one objective has been constantly kept in mind—to maintain the same high quality standards established by Wilmot Stephens when he first forged climbers on a blacksmith's anvil almost a half century ago.

Extreme care is taken to provide safe, comfortable equipment, and every article is inspected to comply with the exacting requirements established by safety engineers.

Buckingham "Cushion Deluxe" Floating Tool Belt No. 58 is made from the best latigo and chrome leathers. It has the "rolled edge" feature that gives a cushion effect with the greatest comfort to the wearer. Rigidly tested for strength and safety.

Here's Why Buckingham Climbers are Safer — More Comfortable!

- Shank a perfect fit, shaped for comfort.
- Wide standing surface slightly rounded to fit foot.
- Round loop will not cut straps.
- Gaff is hammer-forged from special tool steel, set straight with body of climber and close to foot-piece, giving least strain to climber, and maximum comfort to lineman.
- Each climber tested for toughness and strength of gaff rivet.
- Each climber Parkerized (rust proofed) and lacquered.

BUCKINGHAM MANUFACTURING CO., INC.

Walter E. Craw, President — 5-7 Travis Street, Binghamton, N. Y.

Order from your telephone supply dealer.

Buse Telephone Company. The Harmony Southwestern Telephone Company operating in Filmore county, was permitted to sell part of its system in Harmony township to the Harmony-Niagara Cave Telephone Company.

◆

New Owners for Comfrey, Minnesota

The Comfrey (Minn.) Rural Telephone Company, which was recently sold to the North Star Telephone Company, of Mountain Lake, Minnesota was taken over by its new owners January 1.

The North Star company operates automatic systems at Mountain Lake, Butterfield, Odin and Delft, Minnesota, and it is expected that an automatic system will be established in Comfrey.

The Comfrey company has been operating 42 years and covers a radius of approximately 10 miles. The exchange has 400 subscribers, a 200-line board, and employs four operators, a manager, and an assistant manager.

Officers of the company are C. F. Schweiger, president; C. A. Englund, manager and vice president; and C. B. Armstrong, secretary-treasurer.

◆

Power Company Plans Mobile Telephone System

Consumers Power Company, Jackson, Michigan, has announced filing of application for authority from the Federal Communications Commission to establish the largest single private mobile telephone system in the world.

The Michigan Bell Telephone Company, which would furnish the equipment for the system, has submitted a proposal, based on the power company's requirements, for 52 radio transmitting and receiving stations and 767 mobile units.

D. E. Karn, vice president and general manager of Consumers, said the company planned to install mobile telephone equipment in electric and gas construction trucks and service cars.

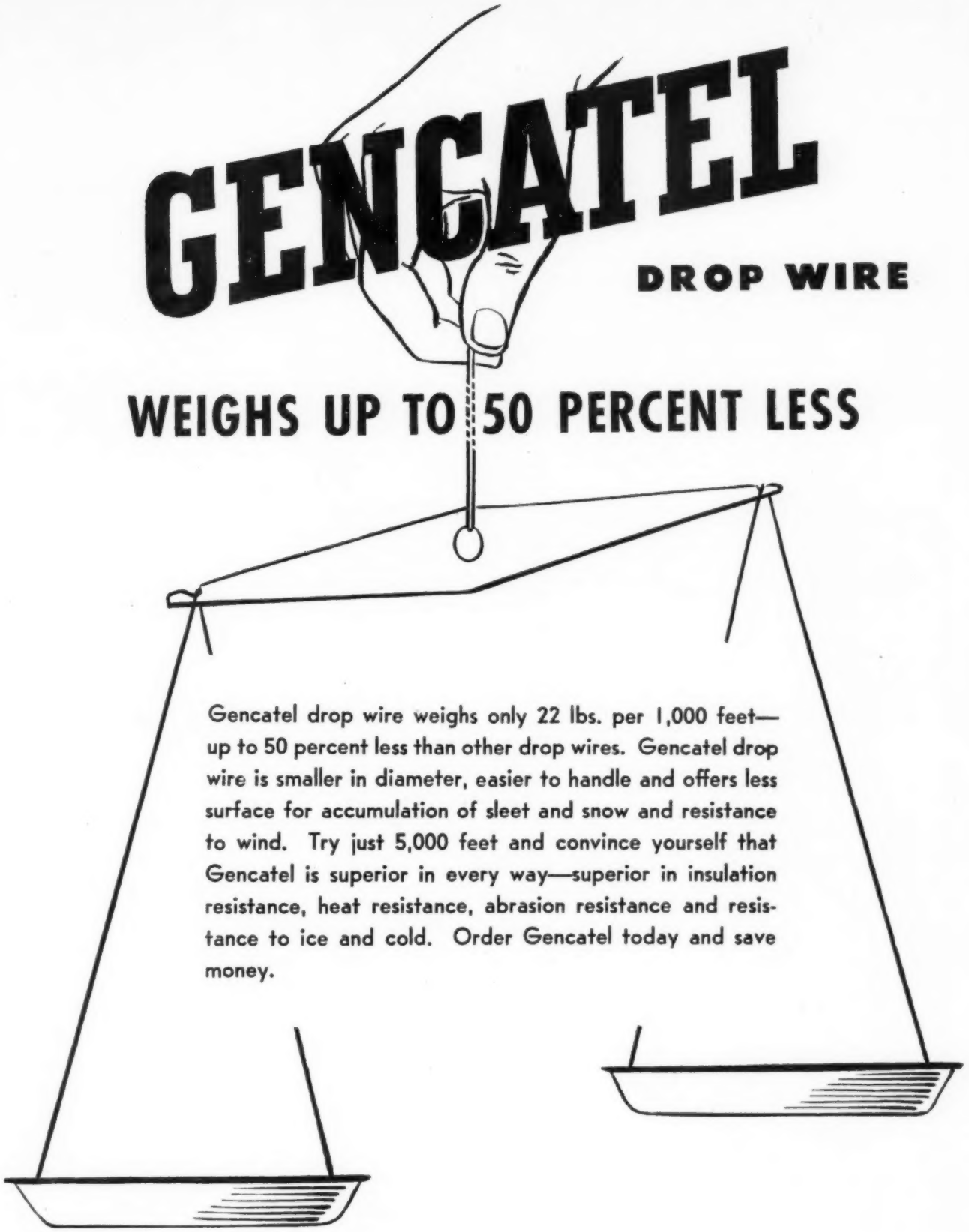
"This will speed up repairs in storms and other emergencies," he said. "It also will enable us to respond to all kinds of trouble calls with minimum delay."

If authorized, the system will be built during a two-year period beginning next Spring. It will cover all of the power company's territory and will be operated over radio frequencies assigned by the FCC. The service will be provided for the exclusive use of the power company, a Michigan Bell spokesman said.

GENCATEL

DROP WIRE

WEIGHS UP TO 50 PERCENT LESS

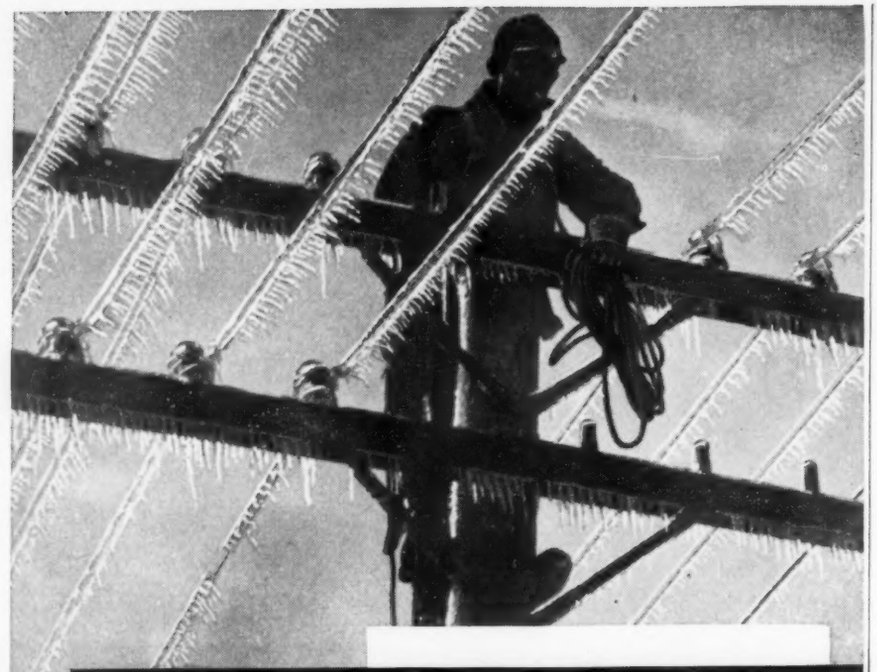


Gencatel drop wire weighs only 22 lbs. per 1,000 feet—up to 50 percent less than other drop wires. Gencatel drop wire is smaller in diameter, easier to handle and offers less surface for accumulation of sleet and snow and resistance to wind. Try just 5,000 feet and convince yourself that Gencatel is superior in every way—superior in insulation resistance, heat resistance, abrasion resistance and resistance to ice and cold. Order Gencatel today and save money.

RECOMMENDED AND DISTRIBUTED BY

AUTOMATIC ELECTRIC
SALES CORPORATION

1033 W. VAN BUREN ST., CHICAGO 7, ILL.



KLEIN PLIERS!

... PREFERRED BY LINEMEN

Wherever there are linemen . . . whatever the job—tough or routine—you'll find Klein Pliers.

There's good reason for this widespread preference that began when the electrical industry was in its infancy and has continued on through the years.

Linemen know they can depend upon the quality and performance of Klein Pliers. Drop forged from the finest alloy steel, each pair is individually tempered and tested—has the proper balance—just the right spring to the handles to minimize hand fatigue. A fitted hinge keeps jaws perfectly aligned—the carefully matched knives cut swiftly, surely and stay keen for years.

The complete Klein line includes pliers for every use. Your supplier will fill your order as quickly as possible.

Ask Your Supplier

Foreign Distributor: International Standard Electric Corp., New York

A copy of the Klein Pocket Tool Guide, showing the Klein line and containing valuable tool information, will be sent on request.

Since 1857

Mathias KLEIN & Sons

Established 1857 — Chicago, Ill., U.S.A.

3200 BELMONT AVENUE, CHICAGO 18, ILLINOIS

Minnesota Convention

(*Concluded from page 37*)

tempt will be made and the call completed or the pursuit continued until it is completed."

Mr. Hayes commented that along with good attitude, adherence to operating practices is essential to getting good completions, and mentioned nine specific items of failure that the Northwestern company has picked out for special attention and remedying:

(1.) Failure to attempt to reach the called party at a second telephone.

(2.) Failure to ascertain whether the calling party wished to talk with an alternate.

(3.) Failure to suggest messenger service when appropriate.

(4.) Failure to have the called party paged on calls to hotels and clubs.

(5.) Failure to secure definite information from the calling or called station which will permit later completion when delay is encountered.

(6.) Failure to follow up delayed calls in accordance with the operating practice.

(7.) Failure to keep the calling party properly advised as to the status of his call.

(8.) Failure to secure disposition and to handle "hold" and AG "time" calls as requested by the customer.

(9.) Failure to take proper action on receipt of "Ready to talk" reports and "Try Again" requests.

Following Mr. Hayes, R. C. Reno, editor of Telephony Publishing Corp., Chicago, presented a timely discussion on "What Is A Fair Return For A Telephone Company." The final speaker of the Tuesday morning session was R. P. Heeter, vice president M. H. Bishop & Co., Minneapolis, who discussed "Financing Independents".

Telephone Valuations

DONALD C. Power, attorney, Columbus, Ohio, discussed "Telephone Valuations As A Basis For Rate-Making" at the Tuesday afternoon session. Mr. Powers stated that the fixing of prices by governmental agencies for various types of commodities and services has become extremely common in recent years.

"Because of the very rapid growth

MODERN Telephone Design by Connecticut

CONNECTICUT'S NEWLY DESIGNED TELEPHONES PRESENT FEATURES OF PRIME INTEREST AND IMPORTANCE TO TELEPHONE MANAGEMENT--

- ***SIMPLICITY OF INSTALLATION & MAINTENANCE.***
- ***EFFICIENT AND RELIABLE PERFORMANCE.***
- ***ADVANCED AND ATTRACTIVE DESIGN.***

1100 Series Wall Model

1100 WALL SERIES

The Compact 1100 Wall Model Is Offered for Dial or Manual Service

CONNECTICUT TELEPHONE & ELECTRIC
DIVISION OF GREAT AMERICAN INDUSTRIES, INC.

MERIDEN GAI CONN.

Order Sample Telephone On Approval To Be Shipped Immediately from Stock.

Please send me:—

☐ Model 1000 Desk Telephone---{ ☐ Less Dial ☐ Dial

☐ Model 1100 Wall Telephone---{ ☐ Less Dial ☐ Dial

☐ Descriptive Folder S959

Company .....

Address .....

.....

Name .....

It takes QUALITY PERFORMANCE to get an ENCORE . . .

and YORK-HOOVER BODIES get "encore orders" time after time

The fact that operators everywhere keep re-ordering York-Hoover Bodies is proof of their confidence in and approval of the York-Hoover product.

Specific purpose design to do a particular job, experienced and skilled engineering for dependability, and honest workmanship for economical maintenance and low depreciation—all contribute to this customer confidence and approval.

To meet this healthy, steadily growing demand, York-Hoover has increased plant and production facilities so that we hope to say "prompt deliveries" in the not-too-distant future.

YORK-HOOVER BODY DIVISION CORPORATION

YORK, PENNSYLVANIA

of price regulation," he said, "we are apt to overlook the fact that the regulation of various types of businesses, both with respect to the type of service that must be rendered and with respect to the rates that can be charged for such services, is a very old practice."

Commenting that the new capital for the expansion of the utility industry, estimated in the billions of dollars, for the next few years will be slow to enter a field in which an investor cannot obtain a fair return upon the value of his investment, Mr. Power discussed the question of valuations for rate making purposes.

"While the valuation of utility properties," he said, "on the basis of original costs to the person first devoting the property to public service may tend to simply for the administrative agency the problem of rate making, such a method can only work to the disadvantage of the present investor whose interest is in the present enterprise rather than in the cost of the property of the company which may have been bought out or merged years ago. Valuations based on original costs are simply the application of a strict formula and result in a figure that is neither historical cost, present value, fair value or replacement cost. And, of course, if we apply the 'prudent investment' theory the result is even worse, for by this doctrine if any part of the original cost or investment is found (with the wisdom that always comes after the event) to have been imprudent, that part of the original cost will be deleted from the base rate."

Mr. Power stated that surely the application of "aboriginal cost" or "prudent investment" methods for determining value will not persuade the present day investor that the best place for the investment of the money, on which he hopes to earn future returns, lies in utility securities.

"We should never forget," he said, "that the profit motive is the keystone of our economic system and that the application of any price fixing policies that restrict an industry to a low and fixed rate of return on either 'aboriginal cost' or 'prudent investment' giving the owners no allowance for any increase in the value of their property as a result of sound planning, able management, good financing, scientific progress and satisfactory public relations, will dry up the source of capital available to the industry for development and expansion and pave the way to government ownership—a fact, not overlooked I am sure by some of our socialistic planners."

Mr. Power said that in Ohio the legislature and the state supreme court have simplified the "fair value" problem

pretty well. The legislature has enacted a statute providing that values should be ascertained on a reproduction cost new less observed depreciation basis and the supreme court of the state has repeatedly held that under the Ohio law this is the exclusive method of determining fair value. The last pronouncement on this subject and the most recent having been given in June 1947 in what is known as The River Gas case. (City of Marietta, Ohio, vs The Public Utilities Commission of Ohio, 148 O. S. 173.)

"Of course," he said, "we in Ohio, are not unmindful of the criticisms that can be and are levied at the 'reproduction' theory of evaluating utility property, particularly, where this theory contemplates an exact duplication of an existing plant as most of the judicial decisions on this subject contemplate. I think we must admit that no one in rebuilding a plant would exactly duplicate an existing plant.

"He would, on the other hand, try to build a plant cheaper if possible and certainly more efficient. In any event the cost of reproducing a plant might as well mean the cost of building another plant that will do the work of the old one and compete with it. Upon this theory if, because of inflation or otherwise, the cost of reproducing the plant should increase, that higher cost of reproduction should be the basis of fixing value for rate making, and by the same token if, because of deflation, the cost of reproduction goes down there should be a reduction in the rate base accordingly."

Mr. Powers called attention to the fact that the application of the "aboriginal cost," "prudent investment" and "book cost less depreciation reserve" theories of fixing value have largely come into prominence since 1930, and during a period when prices generally have been rising.

"Now," he said, "let us assume that in the years ahead we should encounter an extended period of deflation and falling commodity prices. Are any of you so naive as to believe that future utility rates would remain at a high level because they were being computed on a rate base predicted on 'aboriginal cost,' 'prudent investment' or 'book cost less the depreciation reserve'?

"You can be sure that such would not be the case and this is particularly so when we consider that billions of dollars will be expended by the industry for additions and betterments during a period of high prices. We all know that it will be politically and economically impossible for the utility industry to maintain its rates at a level to yield a fair return on a relatively high original cost basis if price levels recede substantially. Furthermore much utility service is competitive

CROSSARMS MAY LOOK ALIKE, BUT—

Last Longer!

Any two crossarms may look alike in the stockpiles, but one may last 12 years on the line and another 36. The difference is the result of expert selection of raw material, scientific kiln drying and controlled air seasoning. Rainier Crossarms are properly conditioned for long-lasting life from the best grade of tough-grained Douglas fir. When you order crossarms, specify Rainier Crossarms made by

RAINIER

AMERICAN CROSSARM AND CONDUIT CO.

RECOMMENDED AND DISTRIBUTED BY

AUTOMATIC ELECTRIC
SALES CORPORATION

1033 W. VAN BUREN ST., CHICAGO 7, ILL.

SINCE 1889
NATCO
CLAY CONDUIT

The proved and standard Protection for Underground Telephone Cables.

Cheapest in the long run. Highest quality and a full line of shapes.

National Fireproofing Corp.
202 E. Ohio Street, N. S.
PITTSBURGH, PA.

TELEPHONE PEOPLE WRITE OUR BEST ADS

"Now that Telephone Advertising Institute provides such excellent material at nominal cost, every small telephone company has available means of keeping the public informed of current problems, future plans, rising costs, and the need for increased rates."

F. S. Florance, *General Manager*
Highland Telephone Company,
Monroe, N. Y.
4 exchanges, 3169 stations

▲

For full information on a complete, inexpensive advertising and public relations program designed for you, call or write:

TELEPHONE ADVERTISING INSTITUTE
326 W. MADISON ST., CHICAGO 6, ILL.
CENtral 6505

NOW A "Like New" TELEPHONE for Rural Lines

with the appearance and features of new equipment, and new equipment guarantee.

Smaller—more compact cabinet with battery space • Alnico generator • Anti-sidetone induction coil • Condenser • Modern, all position handset • New type concealed ringer

AN OUTSTANDING VALUE

Price.....$22.00, 1600 ohm—$22.50, 2500 ohm

SINCE 1926

TELEPHONE REPAIR & SUPPLY COMPANY

DAN'L H. McNULTY, President and Manager

1760 Lunt Avenue Chicago 26, Illinois

Just Published

THE ELECTRICAL APPLIANCE SALES HANDBOOK

By LAURENCE WRAY
Managing Editor, Electrical Engineering

144 pages, illustrated, $3.50

Here's a practical handbook that gives you all the answers to your appliance sales problems—helps you sell major electrical appliances—refrigerators, ironers, cleaners, ranges, etc.—whatever the competition. Pocket-sized, arranged for quick reference, it boosts electricity as a time, money and energy saver—concisely analyzes the electrical appliance market—outlines successful techniques of appliance selling. It shows how to make extra sales in the small town rural market—gives convincing, sales-closing arguments as to why electricity out-performs all other power sources.

Order copies from

Telephone Engineer Pub. Corp.
7720 N. Sheridan Chicago 26, Ill.

Test-O-Lite

TESTS ANY VOLTAGE...
100 to 550 Volts, A.C. or D.C.
Safely, Swiftly, Surely

THE NEON GLOW
LOCATES TROUBLE -INSTANTLY

Indicates hot or grounded wires. Tells AC from DC. Far superior to ordinary clumsy test bulb indispensable in shop or home. The only pocket-size tester with PATENTED SAFETY FEATURE.

Life-time guarantee. Purchase thru electrical dealers.
Pat. No. 1,778,883.

RTC-2 VINCENT RARE GAS RELAY

for harmonic or coded bells. Dual purpose device which economically improves both ringing and transmission on party lines. NO MOVING PARTS. Fully guaranteed. Can be installed in a minute.

L. S. BRACH Mfg. Corp.
200 Central Avenue Newark, N. J.

and in a struggle for business during a period of falling prices the utilities would be compelled to reduce prices as a competitive matter regardless of what they might be entitled to earn as a matter of theory.

"Surely a regulatory policy of determining value and fixing rates on a 'heads I win, tails you lose' basis is not going to attract the capital that an expanding industry needs in the years ahead."

The final speakers of the Tuesday afternoon session were G. M. Dwelle, owner Dwelle (Minn.) Telephone Company, who discussed "Results of Converting To Dial Operation After 50 Years Experience With Magneto and Common Battery", and your editor Ray W. Smith who discussed "An Editor Views The Industry."

At the final session on Wednesday, the subject of meeting the public demands for modern and improved services, accomplishments of 1947 and proposed improvements for 1948 were discussed by: H. R. Bollinger, general manager, Pioneer Telephone Co., Waconia; Toral Duckett, Western division manager, Central Telephone Co., Sioux Falls, South Dakota; P. M. Ferguson, Jr., Mankato Citizens Telephone Company, Mankato; H. B. Fine, general manager, Community Telephone Co., Waterville; E. L. Gates, vice president, general manager, Minnesota Telephone Co., Minneapolis, and R. G. Willmarth, district plant superintendent, Central Iowa Telephone Company, LeRoy.

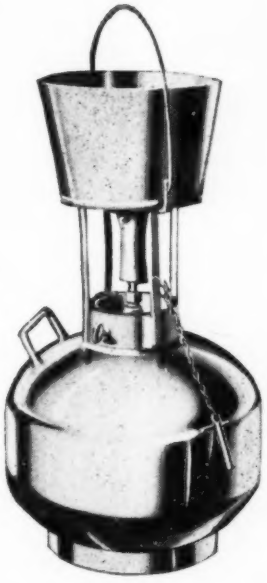
◆

Meadville, Pa., Has New Automatic Equipment

At midnight, December 13, 1947, new Strowger automatic central office equipment was placed in service at Meadville, Pa., principal exchange and toll center for Meadville Telephone Company. Present at the cutover were John H. Wright, president of the company; Ben H. Craven, vice president and general manager, both of Jamestown, N. Y.; L. E. Whiting, local manager and other company officials; local dignitaries and out-of-town visitors.

Mr. Wright, who is president also of Jamestown Telephone Corporation, Jamestown, N. Y., has been the prime moving spirit in this installation of new equipment, plans for which were in the making several years back. Material shortages have heretofore delayed realization of the plans of Mr. Wright and associates to give Meadville subscribers improved service. But the groundwork is now laid with this modern installation for further improvement in the service to Meadville's present 7,500 telephones.

"I Melted 60 Pounds of Lead in 10 Minutes With My MUTUAL LIQUID GAS No. 2 Furnace"



- ✓ No Moving Parts to Repair
- ✓ No Priming, Pumping or Generating
- ✓ No Coils to Carbon-Up
- ✓ No Smoke or Odor
- ✓ Safety of Modern Fuel
- ✓ Maintenance Dollars reduced to a few cents

MUTUAL'S No. 2 Furnace is a compact, light-weight unit that saves time and money on the job. Its quick heating qualities have made it popular with telephone men. Its many features include non-warping head, adjustable orifice and tube, removable handle and shield. Shield will accommodate 8" lead pot. Either butane or propane may be used.

MUTUAL Advanced Telephone Field Equipment SAVE Man Hours

Designed by telephone men, MUTUAL'S line of torches (using butane or propane gas) are perfectly adapted to fit the needs of linemen, installers and maintenance men. Mutual Torches are rugged but light and easy to handle . . . light instantly and will not blow out.

MUTUAL'S No. 4 Blow Torch is an ideal tool for the following uses: Soldering joints in line and bridle wire at junction poles, etc.; for minor soldering operations on subscribers' premises; for field use in conjunction with instrument repairs on rural telephones, for heating threaded crossarm bolts, guy clamps, which are so badly corroded that removing is difficult; for smoothing up wiped cable sleeves or removing solder from sleeves and many daily operations faced by telephone men. MUTUAL has a complete line of torches that will fit any need, large or small.

Above are listed a few of the reasons why MUTUAL Liquid Gas Lead Melting Furnaces and Heating Torches are superior to makes which use slow, inefficient fuels. Liquid Gas vapors are drawn off from the liquid within the container by simply opening the valve. Liquid Gas Fuels (Propane and Butane) are about half the weight of gasoline or kerosene. *(Flames can be adjusted from a blast [2300° F.] to candle flame.*

Order from your jobber or write us direct

Write today for Mutual's Illustrated Catalog

Mutual LIQUID GAS EQUIPMENT CO., Inc.
3600 WEST IMPERIAL HIGHWAY, INGLEWOOD, CALIF.

GraybaR
TELEPHONE SUPPLIES
BULLETIN

Whitney Blake TELEPHONE WIRE

When you want drop wire, bridle wire, or inside, jumper, or duct wire, there just isn't any point in using anything but Whitney Blake. For this line — made of top-quality materials, including Teleprene and Plastite insulations — really has "been through the mill" of laboratory and field tests . . . and has come through with superior ratings in all characteristics!

W-B wire is one of the hundreds of telephone supplies which Graybar distributes. They're *all* first-quality products of leading manufacturers.

Whatever your supply requirements, the easiest way to get them is to call our nearest office. A Graybar specialist can be of real help in solving any of your electrical problems. *Graybar Electric Company. Executive offices: Graybar Building, New York 17, N. Y.*
4791

EVERYTHING IN TELEPHONE SUPPLIES via GraybaR

IN OVER 90 PRINCIPAL CITIES

WANT YOUR ORDER FILLED BY OUR STOCKHOLDERS?

Whenever you order anything electrical from Graybar, your requirements *do* receive the personal attention of our stockholders. Graybar is wholly owned by its operating and retired personnel. That's one reason why Graybar people — together forming a huge, nation-wide organization — apply to each job the sense of personal responsibility you associate with a small, well run, *local* business.

Edison Opposes Bell Textual Change Proposals in Recorder Case

The textual changes proposed by the Bell System for the FCC order on telephone recording devices were opposed by Thomas A. Edison Inc. in a reply which was filed with the Commission January 26 to the Bell System petition of December 18. The Edison reply, submitted by Charles T. Jacobs and Andrew G. Haley, termed the textual changes as likely to cause a serious shift in the philosophy of the FCC order and to occasion "various wholly unnecessary problems." The Edison company proposed language of paragraph three of the order that the automatic tone warning devices "shall be provided, installed and maintained by a company or other organization responsible for the furnishing of the telephone service."

The Edison reply said that it had no comment either in opposition or concurrence on the request of the Bell System Companies that the telephone company shall furnish the automatic tone warning device; the change in the frequency of the recurrence of the signal; and the postponement of the effective date, the latter already partially accepted by the Commission.

◆

NARUC-FCC Separations Manual Now Available

The telephone separation manual prepared by the NARUC-FCC Special Cooperative Commitee on Telephone Regulatory Problems is now available at $2 per copy. Secretary Ben Smart of the association is now filling orders already received, the NARUC reported.

◆

Communications Manufacturers Study Steel Allocation by OIC

The Independent telephone manufacturers and other communications equipment manufacturers are understood to be studying the desirability of accumulating information as to steel requirements in the telephone and other branches of communications for possible submission to the Office of Industry Cooperation in the Commerce Department.

The OIC is studying the potentialities of voluntary allocation agreements on steel and other short-supply materials with industry. During the war, the telephone and telegraph and international communications industries received priority treatment on allocations of strategic materials from the War Production Board so the same priority situation undoubtedly will prevail in the existing condition of short supply of steel.

Roundtable LINE and DESK Discussions

Edited By
J. S. REED, JR.

Q. What factors should be taken in consideration when engineering a conversion of a manual exchange to dial operation?

A. Economic factors are involved in the problem of deciding if the manual exchange should be converted to dial operation. The first one is, will the increased rates for service that will be obtained assure a reasonable return on the investment? Second, will it be necessary to rebuild the outside plant and also will more maintenance of the plant be required, particularly with respect to replacing defective wires, bad drops, trimming trees? Third, will space be available for the equipment; in other words, will it be possible to erect or rent small buildings that can be used for housing the dial equipment and which can be locked up and left alone? Fourth, will a manual center be available for obtaining information service and toll service, and reporting trouble in lines and equipment. Fifth, can an agency be obtained that will take orders and receive payments for telephone service?

Another factor that may be a deciding influence is that certain kinds of special services may have to be discontinued as providing secretarial service for business and professional men, operating fire sirens, handling police calls, and giving the time of the day.

◆

Q. We have sag and oscillation data for stringing messengers for ring supported cable. Can the same data be used for wire lashed cable?

A. While experience has indicated that somewhat lower tension should be used for wire lashed cable strand than for ring supported cable strand, the difference is not important in view of the fact that it is difficult to obtain accurate stringing tension by the sag or oscillation method, particularly the latter. In case of doubt, it is better to have somewhat less tension in the messenger than specified for the size of cable to be placed. Slightly less tension than normal will do no harm; whereas greater tension may result in bowing of the cable at poles due to the fact that increasing the messenger tension apparently increases the difference in thermal expansion between the steel strand and the cable sheath.

Free Help on Problems

IF YOU DON'T see a ready answer to your questions, let TELEPHONE ENGINEER'S staff of technical men tackle it for you. This is a free service. Your question and the resulting answer may not only solve your problem but help the many other telephone men reading these columns. Jot your questions on a postcard and look to LINE and DESK for reply.

◆

Q. Should a toll center handle services for an automatic exchange operated by a different company?

A. When a manual office is a toll center for a number of foreign automatic exchanges, it should perform all the manual work for foreign automatic community exchanges that it does for its own automatic exchanges. This may consist of the following: information service, assistance service, interception, checking of alarm signals, and trouble dispatching.

◆

Q. We plan to place a drop wire lead three miles long. Would the transmission loss be too great on a line of this length?

A. A drop lead of this length would have rather considerable transmission loss due to the small size of the wire and relatively low conductivity of the conductors; but, as a temporary expedient, it would provide fairly good service. It might be expensive compared to a steel wire bracket lead, for the reasons that (1) the drop wire has a short life, five to ten years, particularly if there are heavy tree growths along the lead; (2) the maximum span length is 150 feet, requiring about 35 poles to the mile; and (3) the sag must be adjusted to a minimum of 42 inches for each span (medium loading district), creating clearance difficulties. On the other hand, if a bracket lead is built, it is possible to reduce construction costs by using long spans of high strength steel line wire and obtain good transmission and long life of the lead.

◆

Q. Should we use a gas detector before entering a manhole?

A. The requirement for testing a manhole for presence of gas before doing any work inside it becomes a nuisance in time. Workers may then be tempted to omit this safety precaution when they think there couldn't possibly be any gas in the manhole. The safest practice is to always require thorough ventilation of a manhole before entering it for any reason. Cable splicers having occasion to work in manholes should be provided with gasoline-engine powered blower with blower hose. The end of the hose should be set near the bottom of the manhole so that the fresh air from the blower will rise and force gas or vitiated air out of the manhole. As a further precaution, the duct entrances should be plugged to prevent gas from flowing into the manhole from the cable ducts if excessive gas is noted. Vacant duct entrances may be plugged with wood blocks wrapped with cloth saturated with roofing compound. Occupied duct entrances may be sealed with roofing compound or common brown soap. (The soap is only a temporary expedient and should be removed after work in the manhole is completed.)

A Microwave Relay System Between New York and Boston

(*Continued from page 29*)

two frequencies are also used for transmission in the opposite direction. The method of changing these frequencies, which is illustrated in Figure 2, is such that there is never a high-level and low-level signal of the same frequency at any one repeater station.

Four shielded lens antennas of high directional discrimination are provided at each repeater station. Separate antennas are used for transmission and reception, but each antenna handles both channels; one pair of antennas receives and transmits the two channels in one direction, and the other pair receives and transmits the two channels in the opposite direction, as indicated in Figure 2. Branching filters separate the channels at the outputs of the receiving antennas and combine them at the inputs to the appropriate transmitting antennas after they have gone through individual repeaters.

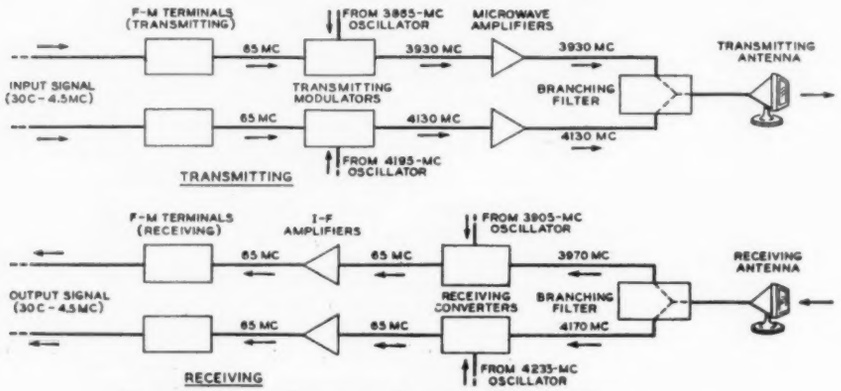


Fig. 4—Block diagram of a terminal station.

Essential Elements Of Terminal Stations

EACH REPEATER in the system is required to introduce sufficient gain to offset the loss in the preceding radio path. Some of this gain is obtained from a microwave amplifier, but the greater part is supplied by an intermediate-frequency amplifier at 65 megacycles. A block diagram of the essential elements of a repeater is shown in Figure 3. The incoming microwave signal is brought down to 65 megacycles in the receiving converter. After amplification at this frequency, the signal is translated back to the microwave range by the transmitting modulator, where it is further amplified and applied to the transmitting antenna.

At the New York and Boston terminal stations, equipment is provided for putting the multiplex telephone, television or other broadband signals onto the outgoing radio relay channels, and for removing them from the incoming radio channels. Block diagrams of the essential elements in the terminal stations are shown in Figure 4.

Conclusion

IN THE transmitting terminal equipment, a 65 megacycle carrier is frequency modulated by the broadband input signal. This modulated carrier is then translated to the microwave range and amplified, using transmitting modulator and microwave amplifier units similar to those in the repeaters. At the receiving end, the 65-megacycle frequency-modulated carrier is obtained from a receiving converter and intermediate frequency amplifier similar to the corresponding units of a repeater. This modulated carrier is delivered to the receiving terminal equipment where the original multiplex telephone or television signal is recovered.—THE END. (*Reprinted from the Bell Laboratories Record.*)

STROMBERG-C

Replace Operator's Batteries with long life

electrox battery eliminator

Type PA-05004

Plugged into your light circuit, the PA-05004 will deliver a constant, humless direct current to the operator's circuit on magneto switchboard. In case of power failure, Power-off Relay automatically transfers operator's circuit to stand-by dry cells.

Other Electrox models are available for Lamp Signal (PBX), and Automatic (PAX) Systems. Capacities of 0.5 to 6 amps, from 12 to 48 volts.

MADE BY THE
ELECTROX DIVISION, SCHAUER MACHINE CO.

STROMBERG-C

BRANCH OFFICES: CHICAGO

RG–CARLSON Recommends——

build for permanence and economy *with poles bearing this trade-mark*

The T. J. Moss Tie Company's creosoted southern yellow pine poles are time-proven.

Every pole is full-length pressure-treated in accordance with American Wood Preservers' Association specifications.

MTCo

The Stamp of Character

FOUNDED 1879

armstrong's *glass insulators*

STRONGER THAN SUPPORTING PINS!

Both in laboratory tests and in actual use, Armstrong's Glass Insulators have consistently proven stronger under transverse strains than the pins which support them!

This superlative quality is no accident. For more than 25 years, Armstrong's Insulators have embodied the finest in glass-making know-how.

Proof against every extreme of weather, these insulators also discourage malicious breakage. Crystal-clear, they are practically invisible against the sky.

Proof of their quality is the fact that leading communications systems all over the globe specify "Armstrong's" when buying glass insulators.

They conform to—or exceed—A.S.T.M. standards

this chip tells the story...

of the Permanent Weld in

copperweld

Lathe-turned from a section of a Copperweld billet, this chip clearly illustrates copper and high-strength alloy steel permanently united. The two metals are *welded* to each other and *cannot be separated.* This *permanent weld* is achieved by the exclusive Copperweld process of molten-welding.

By specifying "Copperweld Telephone Line Wire" you are assured of the electrical and mechanical characteristics most vitally needed for dependable and economical service—the high conductivity and corrosion-resistance of copper, plus the rugged strength of steel.

RG-CARLSON FACTORY, GENERAL OFFICES: ROCHESTER 3, N. Y.

AGO NSAS CITY 8. SAN FRANCISCO 3. IN CANADA: STROMBERG-CARLSON COMPANY LTD. TORONTO

STROMBERG Telephone CARLSON

Better
Get your
Order in –
Many supplies
are mighty thin

If you wait too
long to order
material—you'll
be out'a luck—

Same thing
applies if you're
not wise

in getting help
to do your

Construction or
Engineering

Don't write or wire
just telephone—
Main 6533
Columbus (8) Ohio
if you want or need
us—

GUSTAV HIRSCH
ORGANIZATION
Inc.

Winter puzzle
—how to keep the man
OFF the pole

U·S·S Amertel will help

● Maintenance costs skyrocket when blizzards strike your lines. But the high tensile strength of U·S·S Amertel Wire will help to keep them down.

Amertel-135 has a breaking strength of 1213 pounds for size No. 12 B.W.G. This is about 165% greater than BB iron wire.

Amertel-85 has a breaking strength of 793 pounds which is approximately 67% better than that of B.B. wire of No. 12 size.

Amertel-135 is especially adapted to long span construction at low cost. Amertel-85 is best for medium long spans for exchange and rural use. Both types have an extra factor of safety for better resistance to wind and sleet.

To reduce maintenance even more, many companies are installing P.F.T. Preformed Armor Rods which effectively dampen vibration and protect the conductor at its most vulnerable point—the support. Write for complete engineering information.

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
Columbia Steel Company, San Francisco
Pacific Coast Distributors
Tennessee Coal, Iron & Railroad Company,
Birmingham, *Southern Distributors*
United States Steel Export Company, New York
UNITED STATES STEEL

Look for this tag
It is your assurance
of high quality wire.

T. F. Cassidy Leaves Gray To Join Automatic Electric

Announcement has been made by Automatic Electric Company that T. Frank Cassidy, Jr., formerly chief engineer of The Gray Manufacturing Company, Hartford, Conn., has joined the Automatic Electric organization as manager of the Company's newly organized paystation department. He assumed his new position on February 1, and will shortly take up permanent residence in Chicago.

For the past several weeks, Mr. Cassidy has been temporarily assigned to the Automatic Electric organization in Chicago, assisting in the planning of the Company"s paystation production facilities, following Automatic's purchase in December of the Gray line of paystations.

The design, manufacturing and promotion of telephone paystation equipment have occupied Mr. Cassidy's attention throughout practically all of his business career. He started work with the Gray Telephone Pay Station Company—which later became The Gray Manufacturing Company— in 1926, during summer vacation from Rensselaer Polytechnic Institute. Two years later he took permanent employment with the Gray Company, and

T. FRANK CASSIDY

since that date has been continuously engaged in various phases of the telephone paystation business, including engineering, manufacturing and sales. He served successively as telephone engineer, telephone sales manager, plant manager, and more recently as chief engineer and director of product development. His work in these several capacities has been a dominant influence in the guiding of paystation development and manufacture along sound and progressive lines.

As plant manager of the Gray company during the war years, Mr. Cassidy directed the engineering and manufacture of war products, particularly air borne radar spinners. During this period also, the forerunner of the Audograph, now manufactured by the Gray company, was developed for the armed forces. Following the war, Mr. Cassidy directed the re-engineering of this device for commercial application in the dictation and telephone recording fields.

Mr. Cassidy is a graduate of Rensselaer Polytechnic Institute (M.E. '28), and is a member and past section chairman of the American Society of Mechanical Engineers.

◆

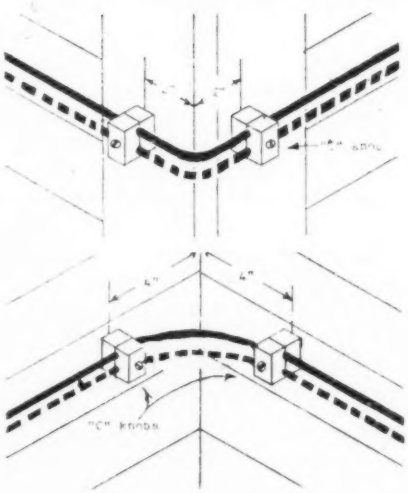
Ohio Bell Requests 9% Rate Increase

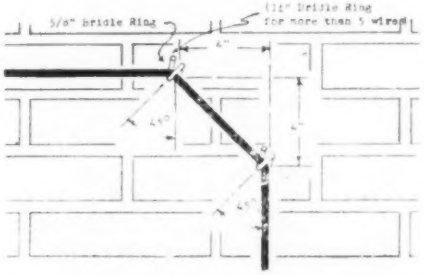
An application for a rate increase averaging about 9% for all types of service was filed with the Ohio Public Utilities Commission February 2 by the Ohio Bell Telephone Company.

The company, whose one million subscribers represent about 80% of the telephone users in the state, said the request for a rate increase was the first made by Ohio Bell since 1925.

Index—Drop Wire Installation
Date—February 15, 1948

Methods of Supporting Drop Wire Runs On Buildings





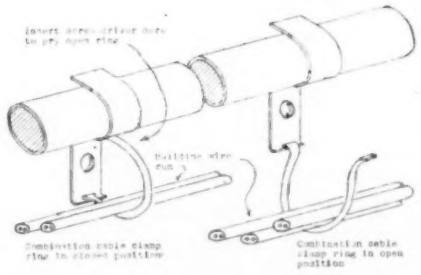


Fig. 1 (Left)—Supporting run of one or two wires on frame building. Upper diagram shows run turning outside corner. Lower diagram—run turning inside corner.

Fig. 2—(Center)—Supporting run of one or more wires at turns in run on brick building.

Fig. 3 (Right)—Supporting wire run in combination clamp rings when run parallels cable attached alongside of brick building.

ESTWING TOOLS
are
CUSHIONED for *COMFORT*

The sole-leather laminated construction of Estwing Tool handles, with I-beam core, cushions the hand against shock, provides extra resilience for the perfectly balanced, finely tempered heads. Handles never break—heads cannot fly off! For hammers, axes and hatchets, specify Estwing.

RECOMMENDED AND DISTRIBUTED BY

AUTOMATIC ELECTRIC
SALES CORPORATION
1033 WEST VAN BUREN STREET, CHICAGO 7, ILL.

We're living in an age of specialists, today. Take the field of medicine for example . . . one doctor may diagnose, another treat, still another operate. Each is a specialist in his own field. The folks at RUNZEL are specialists, too. Specialists in making cords, wires and cables for the telephone industry. No thousand-and-one items of equipment at Runzel! Just cords, wires and cables—the ***finest*** cords, wires and cables in the industry.

RUNZEL CORD & WIRE CO.
4723-31 MONTROSE AVENUE • CHICAGO 41

Nebraska Continental Company Promotes M. F. Snavely

G. A. Klein, general manager of the Nebraska Continental Telephone Company, Columbus, Nebraska, has announced the appointment of M. F. Snavely to the position of district manager of district No. 2 of the company, with headquarters at Kearney. District No. 2 comprises 15 exchanges serving approximately 6,625 stations and 15 connecting companies.

Mr. Snavely supersedes B. A. Bunting who is being transferred to the position of assistant auditor in the general office at Columbus.

Mr. Snavely, who has assumed his new duties, comes from the general office of the company at Columbus, where he has served in the capacity of general plant supervisor. He started his telephone career in Kearney with the Nebraska Bell Telephone in 1912 and was employed by that company at Grand Island, Mason City and St. Paul.

◆

Improved Service For Entiat, Wash.

Roy E. Downey, western district manager of Interstate Telephone Company has announced that the exchange at Entiat, Washington, serving about 125 subscribers, was cut over to automatic operation. The new unit replaced a magneto board and instruments and will be unattended.

About $60,000 was expended in rehabilitation of farm lines and plant within the city limits, including new pole lines, wire, trunking facilities, cable and the placing of new dial equipment. The probable number of subscribers at this exchange will approximate 250 to 300.

◆

Interstate Telephone Co. Announces Organization Changes

Interstate Telephone Company, operating in Eastern Washington, Northern Idaho, and Western Montana, have announced the promotion of George B. Amas formerly wire chief at Newport, Washington, to the position of Eastern District Manager, with headquarters at Coeur d' Alene, Idaho.

Mr. Amas has been with Interstate for over 20 years and ascends to his new position well qualified to fulfill its duties.

Mr. Amas replaces Charles N. Tyson who has been elevated to the position of advertising supervisor and editorial director of the company publication "The Relay."

Open Wire Terminations

(*Continued from page 32*)

Connecting Wires at Dead-End Points

WHEN THE wires are dead ended on brackets or crossarms, compression type dead-end sleeves or wedge type clips may be used to attach the wires to the insulators. If the line consists of ordinary B.B. iron wire, a twisted dead-end tie may be utilized. For high-strength steel wire, however, it is necessary to use a dead-end connection that will not break or be dangerously weakened, as would happen if the wire were twisted. The method of making a dead end connection with offset compression sleeves is illustrated in Figure 9.

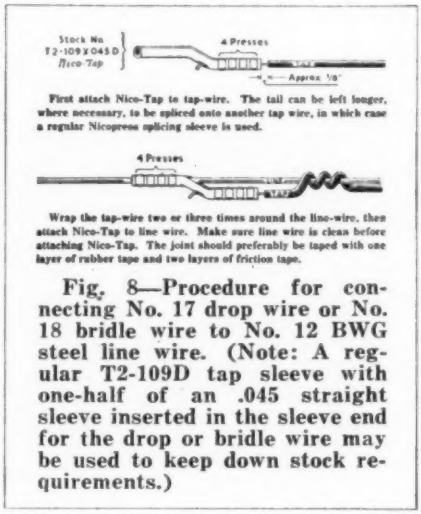

Stock No.
T2-109 X 045 D
Nico-Tap
4 Presses
TAP
Approx. 1/8"
First attach Nico-Tap to tap-wire. The tail can be left longer, where necessary, to be spliced onto another tap wire, in which case a regular Nicopress splicing sleeve is used.
4 Presses
TAP
Wrap the tap-wire two or three times around the line-wire, then attach Nico-Tap to line wire. Make sure line wire is clean before attaching Nico-Tap. The joint should preferably be taped with one layer of rubber tape and two layers of friction tape.

Fig. 8—Procedure for connecting No. 17 drop wire or No. 18 bridle wire to No. 12 BWG steel line wire. (Note: A regular T2-109D tap sleeve with one-half of an .045 straight sleeve inserted in the sleeve end for the drop or bridle wire may be used to keep down stock requirements.)

To connect drop or bridle wire to the line wire at a dead end point, the procedure pictured in Figure 10 may be followed. In this case, the insulated wire is connected to the tail of the line wire by means of a straight compression sleeve, using one-half of a small sleeve for the smaller wire as shown, rather than a reducing sleeve. To minimize vibration at the point of connection, the sleeve is afterwards flattened against the dead end connection.

If it is necessary to open the line for tests, the insulated wire is cut at point "A" as indicated in Figure 10, and then respliced with small compression sleeves. This procedure may be repeated at other points along the drop conductors, care being taken to tape the connections each time. In the case of common battery or dial lines, particularly dial lines

(*Please turn to page 66*)

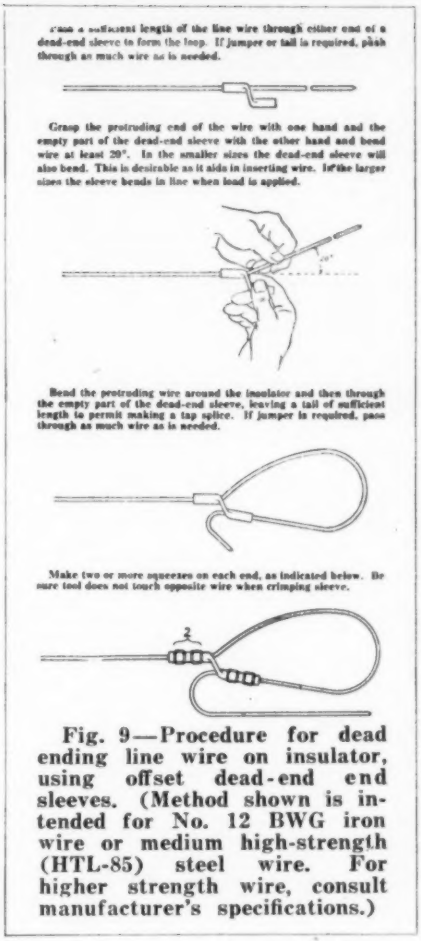
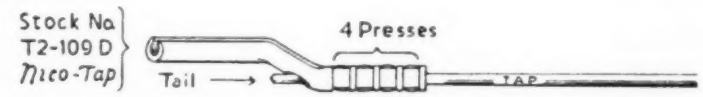
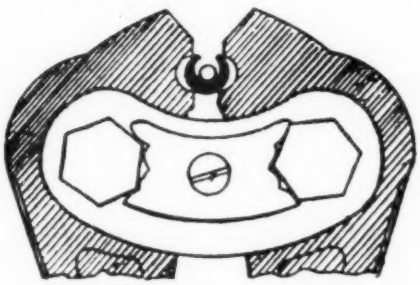

dead-end sleeve to form the loop. If jumper or tail is required, push through as much wire as is needed.
Grasp the protruding end of the wire with one hand and the empty part of the dead-end sleeve with the other hand and bend wire at least 20°. In the smaller sizes the dead-end sleeve will also bend. This is desirable as it aids in inserting wire. In the larger sizes the sleeve bends in line when load is applied.
Bend the protruding wire around the insulator and then through the empty part of the dead-end sleeve, leaving a tail of sufficient length to permit making a tap splice. If jumper is required, pass through as much wire as is needed.
Make two or more squeezes on each end, as indicated below. Be sure tool does not touch opposite wire when crimping sleeve.
2

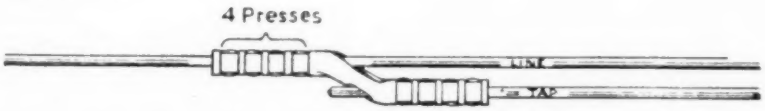
Fig. 9—Procedure for dead ending line wire on insulator, using offset dead-end end sleeves. (Method shown is intended for No. 12 BWG iron wire or medium high-strength (HTL-85) steel wire. For higher strength wire, consult manufacturer's specifications.)



First attach Nico-Tap to tap-wire. The tail can be left longer, where necessary, to be spliced onto another 12 BWG wire using a regular Nicopress splicing sleeve.



Hold the tool so that the open end of Nico-Tap lines up with open end of tool.



Then attach Nico-Tap to line wire. Make sure wires are clean before compressing. The joint should preferably be taped with one layer of rubber tape and two layers of friction tape.

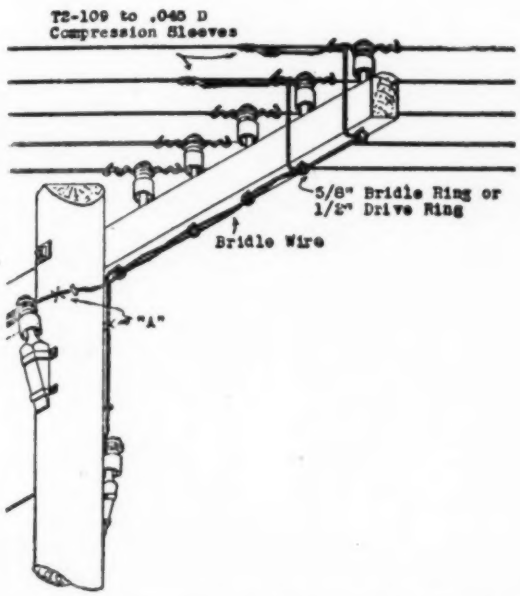
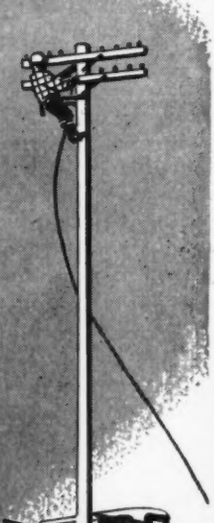


Fig. 7 (above)—Spur line connected to main line in crossarm lead when bridle wire jumpers are used.

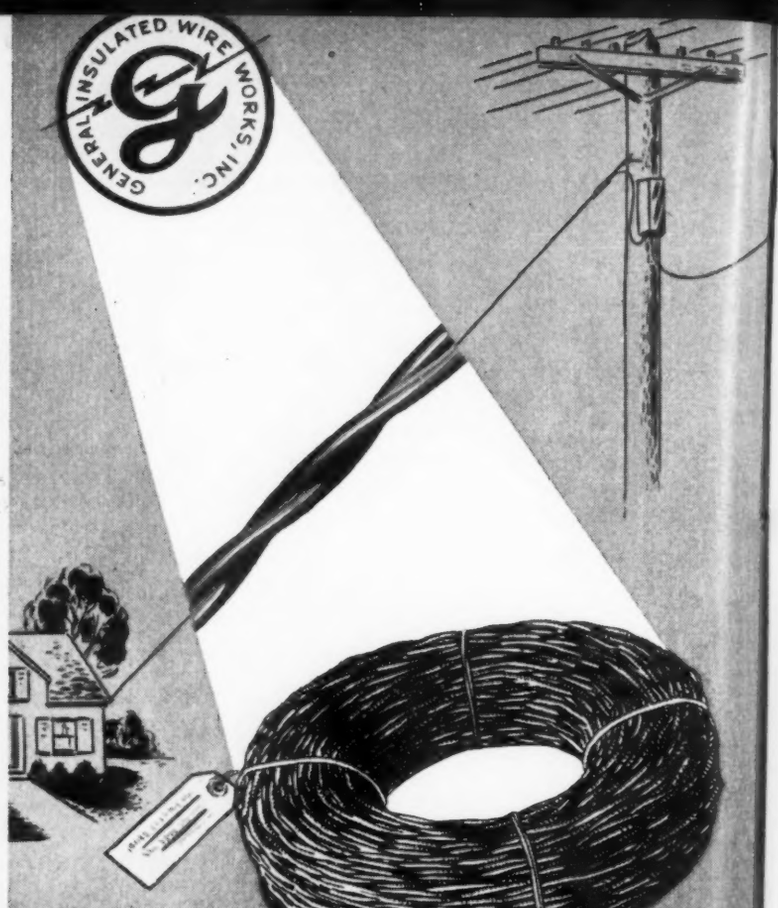
Fig. 6 (left)—Procedure for connecting No. 12 BWG steel line wire to No. 12 BWG steel line wire. (Note: Before crimping, pinch edges of groove in sleeve together with pliers to hold sleeve temporarily on wire.)

ıe Satisfaction Lasts When You Buy Products

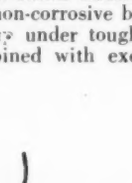
Recommended and Guaranteed by KELLOGG



Long Life Expectancy—is built into pressure-treated Southern Pine Poles and Crossarms. Carefully and thoroughly treated by the AMERICAN CREOSOTE WORKS, INC., these poles have the extra durability required for dependable service under the toughest climatic conditions. For longer lasting, stronger poles, use "Pressure-Treated Southern Pine."

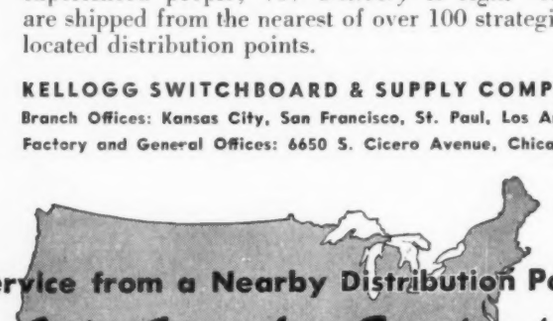


Increase Drop Wire Life 30%—by using GENERAL INSULATED WIRE WORKS Bronze Drop Wire. This high-conductivity wire is drawn of solid non-corrosive bronze and covered with Neoprene, the insulation that stands up under tough punishment. Its unusually high tensile strength is combined with exceptional flexibility for easy handling.



There's three-way satisfaction when you concentrate purchases of line supply and construction materials at a single, responsible source: (1) The *quality* is right—all products are backed by the famous Kellogg DOUBLE GUARANTEE; (2) The service is right—orders are intelligently handled by experienced people; (3) *Delivery* is right—orders are shipped from the nearest of over 100 strategically located distribution points.

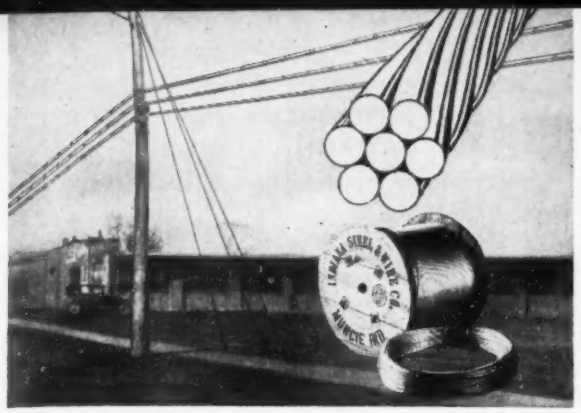
KELLOGG SWITCHBOARD & SUPPLY COMPANY
Branch Offices: Kansas City, San Francisco, St. Paul, Los Angeles
Factory and General Offices: 6650 S. Cicero Avenue, Chicago 38



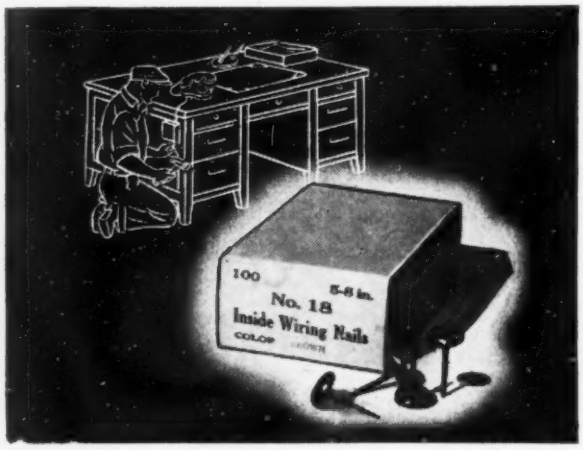
For Service from a Nearby Distribution Point

Order Your Line Supplies from

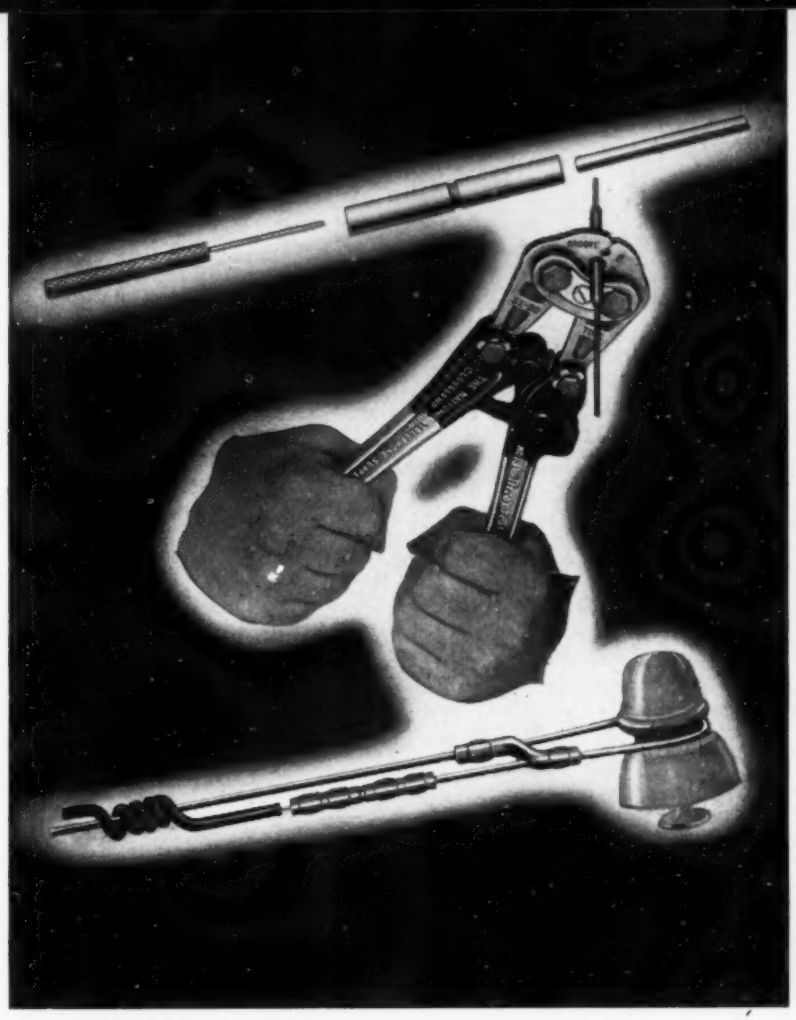
KELLOGG



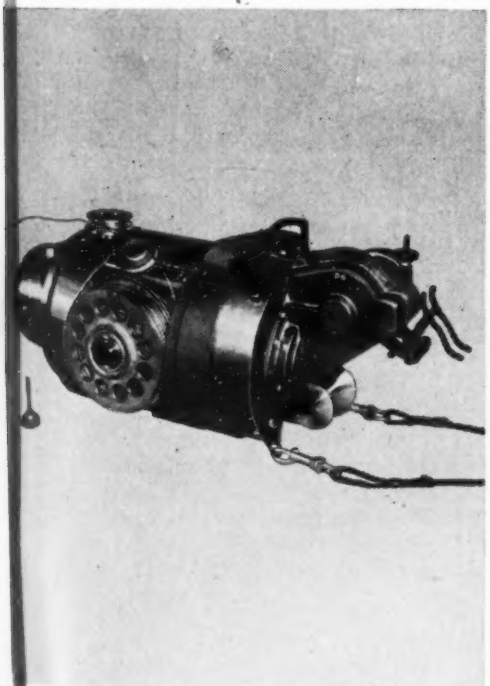
The Time-Tested Steel Strand. A heavy, ductile, tightly adherent zinc coating, applied by the famous Crapo Galvanizing Process, provides lasting protection from corrosion in Indiana Crapo Steel Strand. Made by INDIANA STEEL & WIRE CO., its rugged strength minimizes maintenance.



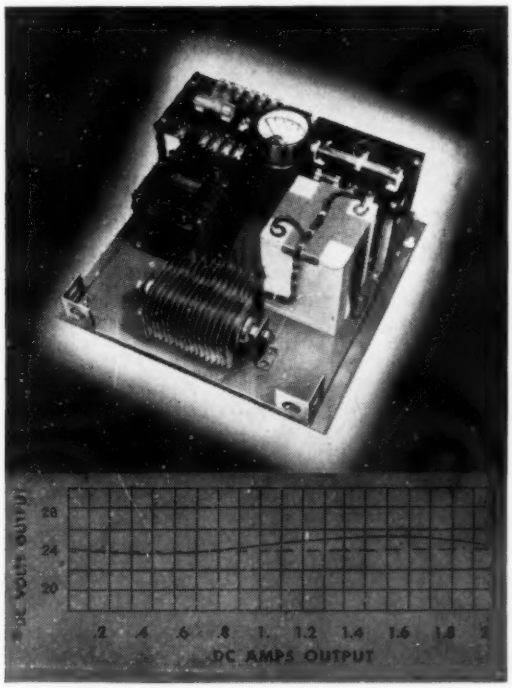
It's a Snap to make neat installations with Rhodes Telephone Wiring Nails according to telephone men who use them exclusively. M. M. RHODES & SONS maintain the uniform high quality of these nails by putting them through rigid driving, withdrawing, bending and immersion tests.



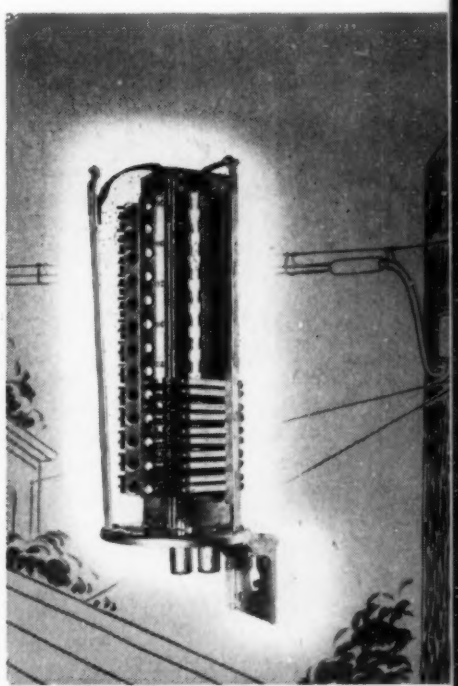
Simple, Quick and Sure! When it comes to splicing two wires of different size, there's nothing to equal the simplicity of using Nicopress Reducing Sleeves and the Nicopress Tool. Splices are tight and strong and their breaking strength far exceeds that of the conductors. Sleeves are made in various sizes by NATIONAL TELEPHONE SUPPLY COMPANY.



Lower Costs On New Construction! The Model "D" Neale Spinner, made by CABLE SPINNING EQUIPMENT CO., operates smoothly under all conditions. Ratchet locks it in position whenever pull on tow line is released, regardless of the machine's location on the strand.



Steady DC Voltage—required by switchboard lamps and telephones (especially dial), can be assured when you use a Recti-Filter. Made by RAYTHEON MANUFACTURING COMPANY, it operates from regular AC source. And with no moving parts to wear, maintenance is low.



Nothing to It! Trouble shooting and transmission testing are greatly simplified with the COOK ELECTRIC CO. UA-20 Aerial to Underground Cable Terminal. For tests, merely remove fuses. Effective protection against lightning, power cross and static is provided.

Book Reviews

All books reviewed in this department may be obtained direct from Telephone Engineer Publishing Corp., 7720 N. Sheridan, Chicago 26. Ill.

F-M SIMPLIFIED, by Milton S. Kiver, Registered Professional Engineer (Illinois). Published by D. Van Nostrand Co., Inc., 352 pages; illustrated; price $6.00.

FOR THE FIRST time the entire field of F-M radio has been explained so simply and clearly that any man who has the least knowledge of radio can understand not only the construction and operation of the transmitters and receivers and all the apparatus used in them, but the practical use of this knowledge in operation, installation and in servicing of all present day F-M equipment. The chapters on commercial F-M transmitters and receivers thoroughly cover all the leading sets and circuits in use today.

The chapter on servicing fully explains servicing methods, the specific characteristics of resistance, the condenser, tube operation at the higher frequencies, electron flow, minimizing transit time effects. In addition to these extensions of A-M servicing methods, this chapter also includes complete, detailed information on trouble shooting procedures. This detailed analysis of the chapter on servicing is indicative of the vast amount of useful, practical information, besides the complete basic explanations in this comprehensive book. It is, in short, a complete self-study manual for every man who wishes to master the fundamentals of F-M radio and their actual applications.

• • •

INDUSTRIAL EXPERIMENTATION, by K. A. Brownlee, M.A.; 116 pages; diagrams; $3.75; published by Chemical Publishing Co., Inc., Brooklyn, N. Y.

THE AUTHOR has produced a manual of value not only to chemists but all others engaged in industrial experimentation. The methods presented rest upon a sound theoretical basis. They have also been used to great advantage in several large industrial laboratories and it is reasonable to believe that, within a few years, training in the use of these methods will be considered a necessary adjunct to the training of the industrial experimentalist.

This book shows the use of tests of significance to attain reliability in deductions from experimental data; lists methods of statistical design to accomplish the maximum precision with the minimum expenditure; treats the subject entirely from the practical point of view,—theory is held at a minimum and the only mathematics involved is simple arithmetic; each statistical method discussed is illustrated with practical examples worked out in detail to show exactly what is involved in its use; covers tests of significance of differences between means, the comparison of variances, the analysis of variance, correlation, and factorial experiment, and teaches how to interpret results.

Those who must apply critical tests of statistical significance in practice, often without a full knowledge of their theoretical background, will find this volume particularly useful.

• • •

HIGH-SPEED MATHEMATICS, by Lester Myers. Published by D. Van Nostrand, Inc. 543 pages; illustrated; price $5.95.

IN THIS BOOK the entire range of short cuts in numerical calculations has been organized for easy mastery. The book covers all the rapid methods for computation with whole numbers, mixed numbers, fractions and decimals. The book also shows how to gain the greatest advantages from such powerful tools as the break-down method of multiplication, the double-and-halve method of multiplication, the double-and-double method of division, the two-line method of summation, the factorial system, and the evening-off system.

Speedy processes for multiplying by two, three, or four-figure numbers, for adding two columns of figures at once, for simplifying complex calculations, and other special methods to enable you to perform numerical calculations either mentally, or with a vast saving in the time and number of operations required in written computation are presented.

Open Wire Terminations

•

(Concluded from page 63)

•

that carry 48 volts d-c, precautions should be taken to prevent leakage of current from the central battery through contact of exposed drop wire conductors with the crossarm or pole. Leakage at these points can become sufficiently great in wet weather to mutilate dial pulses and interfere with the proper operation of the automatic switching units at the central office.

The simplest method of preventing this trouble is to wrap the exposed rubber covering of the drop conductors with friction tape on completion of the splicing operation. One layer of tape is usually sufficient, but be

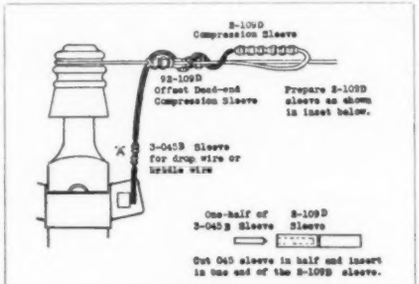


Fig. 10—Method of connecting drop or bridle wire at a dead end point.

sure that the tape runs over the braid covering at least one inch back of the exposed conductors.

The tape covering reduces surface leakage and at the same time protects the exposed rubber covering from deterioration under the influence of sun light.

Newly Developed Plastic Coated Drop Wire

THE NEWLY developed plastic coated drop wire does not require taping of the individual conductors at the line connections. Neoprene or polyethyline covered conductors are relatively unaffected by exposure to sunlight and therefore will not deteriorate.

In many tests—such as compression, pounding, insulation, breakdown, flame and weather tests—it has been proved that the neoprene jacket provides many advantages.—THE END.

Transoceanic Radio Telephony Now Over 20 Years Old

The first New York-London call on a commercial basis was placed on January 7, 1927. This represented the formal opening of trans-Atlantic commercial radio telephone service. At first it was available only to a few overseas countries, but today anyone in this country can talk to telephone subscribers in over 60 overseas countries. The initial equipment made use of long wave transmission from Rocky Point, Long Island to the receiving station in Wroughton, England. Transmission was on a wave length of 5000 meters with an alternate short wave channel on 22 meters. The short wave circuit was used when the long wave circuit could not be operated because of static or other conditions. The Rocky Point long wave equipment is still in operation, but has largely been replaced by short wave equipment and highly directional antennas as the higher frequencies are less bothered by atmospheric conditions.

Overseas transmitting and receiving centers are now established in several points in California, Florida and New Jersey. Direct circuits are now available to many important foreign points whereas in the earlier installations, most of the traffic was routed over one of two circuits via London. The toll rate has dropped from $75.00 (a London call) in 1927 to $12.00 or less on the same call today.

The telephone field has long been alert to the use of radio to supplement wire line service. The opening up of a new part of the radio spectrum will make it feasible in the years ahead to make even greater use of radio, through mobile, special rural, short haul toll and other similar applications.

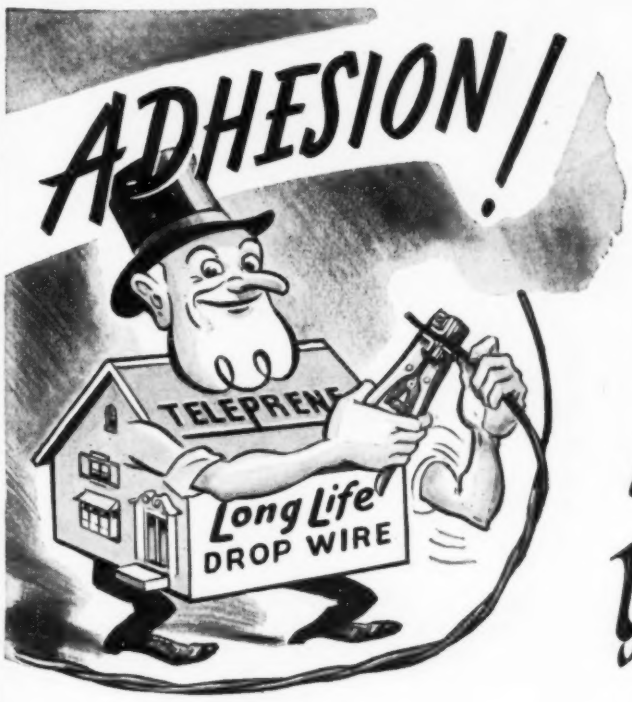
◆

Canadian Bell Requests Capital Stock Increase

Bell Telephone Company of Canada has asked permission of Parliament to increase its capital stock from $150 million to $500 million. The company said that it would use the additional $350 million in a five-year construction program to meet a demand for telephones.

Norman A. Munnoch, general counsel of the firm, said about half the new capital would be raised by borrowings. He added that the firm expected that its present shareholders would put up at least 60% of the money.

American Telephone & Telegraph Co. owns about 15% of Bell Telephone of Canada capital stock.



Get it in Your

Drop, Bridle and Distribution Wires

Specify TELEPRENE

Which has TELEPLATED Conductors

TELEPLATE* is a lead coating applied to the conductors to resist corrosion, then a coating of brass is electroplated over the lead which provides enduring adhesion equal to the tensile strength of the conductor.

Distributed by GraybaR ELECTRIC COMPANY

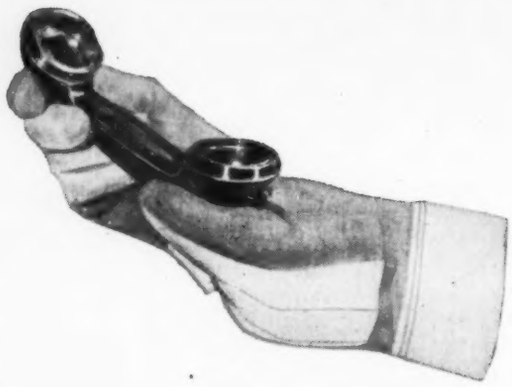
*®

THE WHITNEY BLAKE CO.
New Haven, Conn.
Well Built wires since 1899

In just 30 seconds, the miracle of electronic "cold heat" raises the temperature of phenol plastic—used for molding handset handles—from room temperature to 275 degrees Fahrenheit.

Out of the electronic heater and into the dies go 14 hot pre-forms—looking for all the world like hockey pucks. The press is closed, and presto . . .

Three minutes later, out come 7 glistening new handset handles, "cored" so that wires connecting transmitter and receiver can be inserted.



How to make handset handles twice as fast!

To help meet the tremendous postwar demand for telephones, Western Electric schedules called for making 18,000 handset handles per day—50% above the highest prewar production. With the same number of machines used in 1941, and the same methods, this was impossible—and additional machinery was unobtainable. But wartime ingenuity provided the answer.

Electronic pre-heating of phenol plastic had greatly speeded the moulding of military equipment. Western Electric engineers found it could do the same for handset handles, thus cutting press time in half—doubling production.

But, with this new pre-heating method, wires connecting transmitter and receiver could no longer be molded within the solid handle. So specially arched inserts were developed which "core" the handle, allowing wires to be inserted later.

Not only does this method of manufacture double the output of dies and presses—it also increases the strength of handles because of more uniform heating, improves their finish and reduces rejects. It's a good example of the planning which has enabled Western Electric to shatter all previous records in furnishing telephone equipment for the nation's service.

Western Electric
TELEPHONE APPARATUS AND CABLE

Herbert E. Hussey Elected Vice-Pres. of Indiana Associated

Herbert E. Hussey transferred on January 1, from district manager of the Eastern district of Associated Telephone Company, Ltd., in Pomona, to

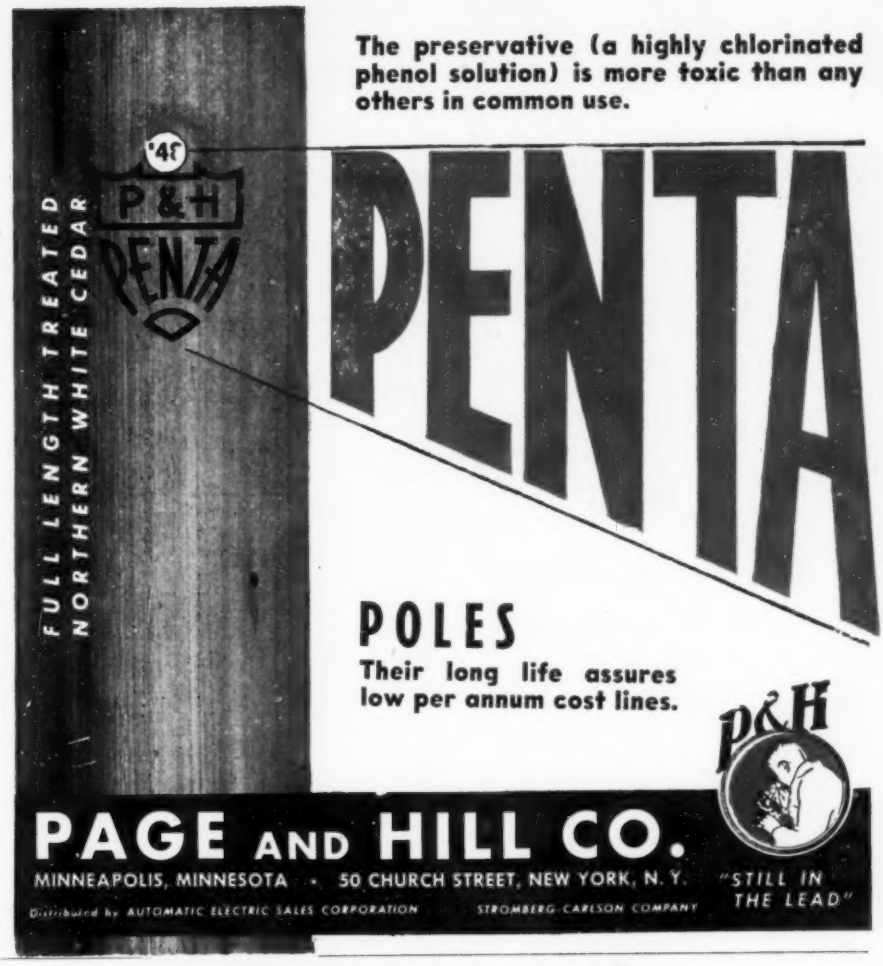
Herbert E. Hussey, new vice president of the Indiana Associated Telephone Co., and chief engineer of the East Central Group of the General Telephone System.

vice president of the Indiana Associated Telephone Corporation, and chief engineer of the East Central Group of General Telephone System operating in Indiana, Michigan and Kentucky. He replaced Ray T. Kieren who succumbed to a prolonged illness on November 14.

Mr. Hussey joined the Southern California Telephone Company in 1924. Two years later he joined the Santa Monica Bay Telephone Company as a draftsman, and remained there until 1928 when he was transferred to Associated Telephone Company at Long Beach and given the supervision of outside plant inventory and preparation of plant records.

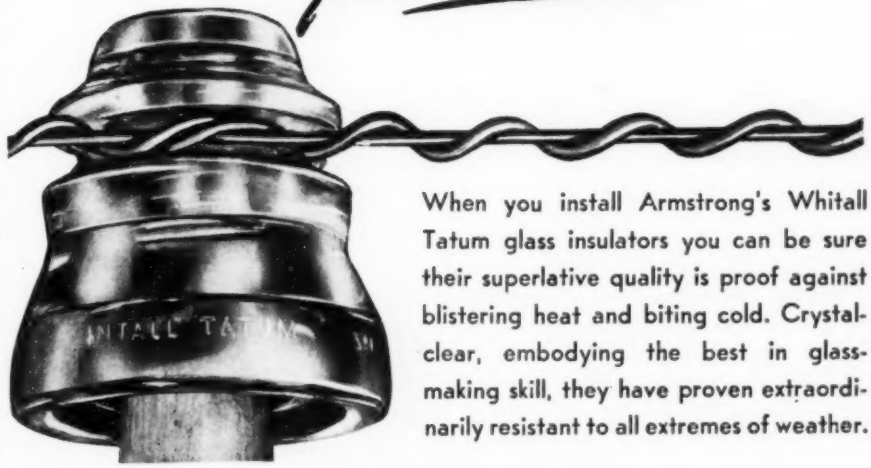
When Associated Telephone Company, Ltd. was formed in 1929 he joined the outside plant engineering department in Long Beach, and a year later the general engineering department when company headquarters were located in Los Angeles.

His first position as district plant superintendent was in the San Bernardino district in 1938. Known as the "traveling plant superintendent", he was transferred from there to the Valley District in Pomona in 1939, and to the Santa Barbara District in 1940. In 1943 he was made general plant supervisor in the executive offices, and on July 1, 1944, became district manager of the new Eastern District.


FULL LENGTH TREATED
NORTHERN WHITE CEDAR
'48
P&H
PENTA
The preservative (a highly chlorinated phenol solution) is more toxic than any others in common use.
PENTA
POLES
Their long life assures low per annum cost lines.
P&H
PAGE AND HILL CO.
MINNEAPOLIS, MINNESOTA · 50 CHURCH STREET, NEW YORK, N. Y.
"STILL IN THE LEAD"
Distributed by AUTOMATIC ELECTRIC SALES CORPORATION
STROMBERG-CARLSON COMPANY

Reduce breakage loss with . . .

Armstrong's glass insulators



When you install Armstrong's Whitall Tatum glass insulators you can be sure their superlative quality is proof against blistering heat and biting cold. Crystal-clear, embodying the best in glass-making skill, they have proven extraordinarily resistant to all extremes of weather.

RECOMMENDED AND DISTRIBUTED BY

AUTOMATIC ELECTRIC SALES CORPORATION

1033 WEST VAN BUREN STREET, CHICAGO 7, ILLINOIS

☆ *Advances in the Industry*

New Telephone Ideas

BY MYRLE SHAFER

RADIO IN DEATH VALLEY . . . Progress in the use of radio for supplementary purposes in the wire tlephone field is rapid. It is now evident to even the most skeptical that radio will become an increasingly important adjunct to wire telephone plants. Typical of the many new projects in which radio is being used by wire telephone companies is the one at Death Valley.

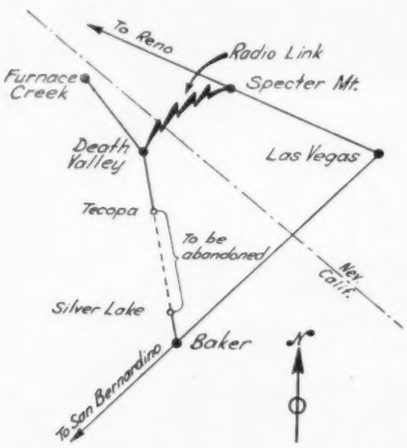


Fig. 1—Routing of radio and wire circuits at Death Valley.

California's Death Valley is one of the most desolate and isolated regions in the United States, but it is a popular winter resort. It has heretofore received telephone service over a two-wire line between Baker, Calif. and Death Valley. This line has now been abandoned and replaced by a Point to Point Radio System (FM) operating in the 150 megacycle band. The radio link is between Death Valley, Calif. and Specter Mountain, Utah. At this point connection is made to a wire toll line leading to Las Vegas, Nevada.

It is 30 miles from Death Valley to Specter Mountain. Two telephone channels are obtained on the single radio channel. Fig. 1 shows this use of radio by a wire line company in the public's interest. This application of radio permits the abandonment of a 37-mile section of difficult to maintain telephone line between Silver Lake and Tepoca, California. The additional talking channels provided by radio (only one was available previously) will improve the service greatly.

• • •

NEW PLANT DEVELOPMENTS . . . The latest thing in buried drop wire is a twin pair 16-gauge copper conductor covered with rubber insulation over which is a braided steel wire armor. The outside jacket is of neoprene. It is thought that the new wire may overcome some of the difficulties that have been encountered with previous types of buried wire.

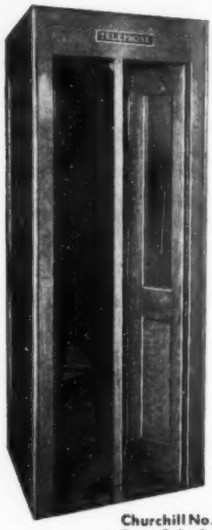
Another new plant item is an intra-span simplified type tandem transposition bracket. This new bracket permits transpositions to be placed between poles. This is important in connection with certain types of high quality carrier-transposed open wire circuits. The new fixture consists of an iron arm holding two grooved insulators in the same plane. The insulators are similar to the old type multi-groove knobs used in drop wire construction.

• • •

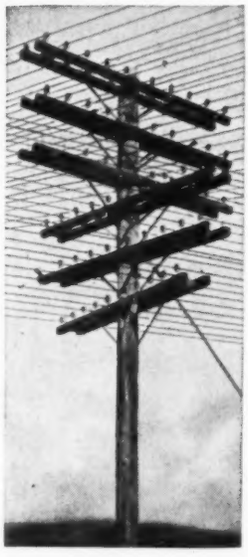
NEW CABLE SHEATH . . . To meet unprecedented demand for telephone cable, a new type cable sheath soon will supplement the familiar lead covered cable which is in record production.

The new sheath is composed of a thin sheet of aluminum covered with a polyethylene compound, a tough, flexible plastic that looks like black rubber. The new product, termed *Alpeth*, is made in a variety of sizes from simple cables to those containing hundreds of pairs of wires. It will be used within local exchange areas on pole lines and in underground conduit.

From laboratory and filed tests, the polyethylene promises to give satisfactory service as a cable sheath material. No change has been made in the cable core itself.

STROMBERG-

The Churchill No. 100 Folding Door Telephone Booth
churchill . . .
an attractive telephone booth
Not only attractive—but comfortable and private—the CHURCHILL No. 100 Folding Door Telephone Booth will increase your pay station business.
Operating companies have found the CHURCHILL No. 100 Folding Door Telephone Booth a builder of pay station business.
It is constructed as a single unit and equipped with a reinforced back panel for mounting a wall telephone or coin collector.
The CHURCHILL Booth is made of selected white oak and is available in light or medium oak in a satin finish.
Included as standard equipment are electric light and automatic electric ventilator.
Overall height is 84¼"; width, 29"; depth, 30½". Shipped knocked down and crated.
Illustrated literature available.
STROMBERG-C
BRANCH OFFICES: CHICAGO

RG-CARLSON Recommends



specify

"dependable" cross-arms

. . . all that the name implies

Cross-Arms made of a uniform grade and expert workmanship by American Cross-Arm, Inc., are available in three types of wood to meet your individual preference:

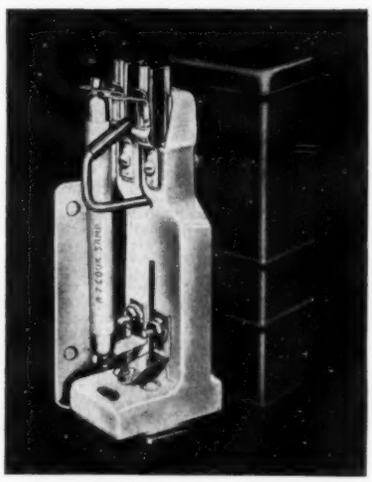
- Douglas Fir
- Creosoted Yellow Pine
- Gulf-Red Cypress

"Dependable" Cross-Arms are sturdy, well-seasoned, and available now for prompt shipment anywhere in the U. S. A.

cook type O *sub-station protector*

This single circuit protector, equipped with fuses and lightning arresters, is unexcelled for either indoor or outdoor use. Special Cook-engineered features include:

1. Heavy white glazed porcelain designed to prevent surface leakage between current-carrying parts.
2. Tru-Gap high-potential dischargers that will not ground the line.
3. Phosphor bronze fuse and arrester springs, zinc hood, Everdur studs and washers. Hood is grounded when in place.
4. Choice of types and lengths of Cook Telephone Fuses.



kennecott telephone cable

is pre-tested to operating company requirements

The construction or maintenance engineer judges telephone cable on three points:

1. Efficiency of transmission
2. Uniformity and quality
3. Long life

Kennecott knows this and, before a foot of cable leaves its mill, subjects it to five critical tests:

1. Dielectric Strength
2. Insulation Resistance
3. Conductor Resistance
4. Capacitance
5. Fixed Dimensions

These are everyday specifications. In addition, Kennecott's staff of electrical engineers works constantly to increase the efficiency of its products.

RG-CARLSON FACTORY, GENERAL OFFICES: ROCHESTER 3, N. Y.

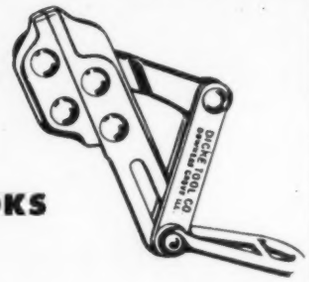
CAGO · SAS CITY 8, SAN FRANCISCO 3; IN CANADA: STROMBERG-CARLSON COMPANY LTD. TORONTO

STROMBERG Telephone CARLSON

SINCE 1886 DICKE

Line Tools...

for Construction and Maintenance



PIKE POLES · PEAVIES

WIRE GRIPS · TACKLES

CANT HOOKS · LUG HOOKS

PAYOUT REELS

Experienced crews prefer Dicke line tools for construction and maintenance work. They depend on their rugged durability—their tough, sure strength in the pinches. From pike pole to payout reel Dicke line tools are uniformly satisfactory. You'll find a Dicke tool for every construction need—all listed in the Automatic Electric catalog.

Recommended and Distributed by

AUTOMATIC ELECTRIC SALES CORPORATION

1033 W. Van Buren St. Chicago 7, Ill.

Just Published

TROUBLES OF ELECTRICAL EQUIPMENT

Their Symptoms, Causes and Remedy

By H. E. Stafford

Electrical Engineer, Marathon Paper Mills of Canada, Ltd.

454 pages, 6 x 9, $4.50

Here is a handy trouble-shooting manual—packed with the kind of practical pointers you can use on the job from day to day to put an end to your motor, transformer, relay, and other equipment troubles. It covers both alternating-current and direct-current apparatus usually found in the average industrial plant. In plain, easy-to-understand language, it shows you how to find and recognize the troubles—tells you what to do to correct them swiftly and surely.

Order copies from

TELEPHONE ENGINEER PUBLISHING CORP.

7720 N. Sheridan Rd., Chicago 26, Ill.

Now you can predict with confidence and accuracy the detailed performance of an electrical appliance before any part of it has been constructed. THROUGH THE USE OF THESE COMPANION VOLUMES.

Principles of

ELECTRICAL ENGINEERING

By T. F. WALL, D. Sc., D. Eng.

Head of Electrical Engineering Department University of Sheffield

576 Pages—$8.50

A comprehensive but compact account of the basic principles of electrical engineering. New developments in applications, testing and materials are fully covered.

CONTENTS: Fundamental Units: Technical Units. Structure of the Atom: Conductors and Insulators: The Electric Current: Electric Resistance. Coulomb's Law: Fields of Electric Force: Potential. Capacitance: Dielectric Constant: Energy of the Electric Field. Current Distributors and Networks: Wheatstone Bridge. Thermo-Electricity: Piezo-Electricity. Magnetism: Magnetic Materials: Magnetic Testing. Electro-Magnetism. Alternating Currents: The Use of Complex Quantities. Oscillating Systems. Alternating Current Power. Some Graphical Methods. Non-Sinusoidal Wave Forms: Harmonic Analysis: Effect of Wave Form On Electrical Measurements. The Penetration of Alternating Magnetic Flux and Alternating Current (Skin-Effect). Propagation of Electric Energy Along Transmission Lines and Cables. The Propagation of Electromagnetic Waves Through Space.

ELECTRICAL ENGINEERING

Problems And Their Solutions

By T. F. WALL, D. Sc., D. Eng.

312 Pages—$5.00

In detailed, step-by-step description, solutions to problems from the whole range of applied electricity and magnetism have been drawn. Both light-current and heavy-current problems have been considered with equal freedom in order to show the universality of the principles.

Questions and answers have been taken from actual practice. They form a valuable guide in the actual working out of numerical and other examples.

Both volumes follow the same table of contents outlined above.

For Immediate Delivery—Place Your Order Today

Telephone Engineer Pub. Corp.

7720 Sheridan Road Chicago 26, Ill.

C. C. Whitlock Appointed General Plant Supt.

It was recently announced by L. F. Shepherd, East Central Group manager that effective January 1, 1948, C. C. Whitlock, Lafayette, Indiana, had been appointed general plant superintendent of East Central Group Operating Companies of the General Telephone Syetem.

Mr. Whitlock was born and raised a Hoosier, originating in the town of Franklin, Indiana. When he was six years old his parents moved to Indiana-

C. C. WHITLOCK

polis and Indianapolis was home to him until early in 1937, when he accepted employment with the Indiana Associated Telephone Corporation and moved to Lafayette.

His first engineering work was with the Public Service Commission of Indiana and consisted mainly of valuations and appraisals of telephone properties.

In the spring of 1937, Mr. F. O. Cuppy, then general manager of Indiana Associated Telephone Corporation, arranged to borrow the services of Mr. Whitlock from the Carter firm for a period of three months. This loan was never repaid as Mr. Whitlock elected to remain with the telephone company. His employment started as engineer and later was changed to assistant to Wm. C. Steinmetz, plant superintendent.

He remained in this capacity until March, 1944 when he was assigned the position of assistant chief engineer under the late Ray T. Kieren. Mr. Whitlock remained in the capacity of assistant to Mr. Kieren until Mr. Kieren's recent death.

FEDERAL'S NEW FTR 804A CONVERTIBLE MAGNETO TELEPHONE

is Now Available for

IMMEDIATE DELIVERY

at these New

LOW PRICES

for Quantity Lots

- **FOR DESK MOUNTING** complete with cord and terminal block **$29.75**
- **FOR WALL MOUNTING** **$28.80** without cord and terminal block

The SAME UNIT is used for either desk or wall mounting, simply by reversing the position of the cradle.

WITH FEDERAL'S new FTR 804A magneto convertible telephone, there's no need to stock separate desk-type and wall-type units. This one, compact, light-weight telephone can be arranged for either desk or wall mounting—by removing two screws and rotating the cradle 180 degrees. A simple screwdriver operation that can be done "on the spot" when the unit is installed.

Other advantages of this new Federal development include:

SMALL SIZE and light weight—50% smaller and 50% lighter than old-style magneto sets.

MODERN STYLING—Attractive, streamlined design, with all the style and convenience of the modern city telephone.

SILENT OPERATION—Improved anti-sidetone circuit, designed for sidetone reduction on loops of varying resistance.

STURDY CONSTRUCTION and expert workmanship. Capsule-type transmitter and receiver units.

Write for complete information today. Dept. G649.

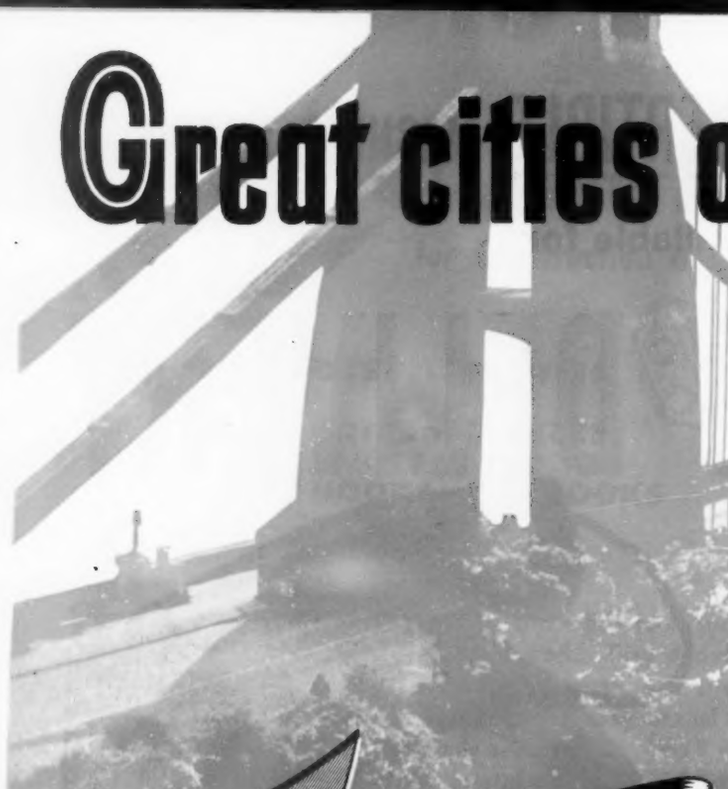
KEEPING FEDERAL YEARS AHEAD... is IT&T's world-wide research and engineering organization, of which the Federal Telecommunication Laboratories, Nutley, N. J., is a unit.

Federal Telephone and Radio Corporation

100 KINGSLAND ROAD, CLIFTON, NEW JERSEY

In Canada:—Federal Electric Manufacturing Company, Ltd., Montreal, P. Q.
Export Distributors:—International Standard Electric Corp. 67 Broad St., N. Y.

Great cities of the world rely on Strowger te

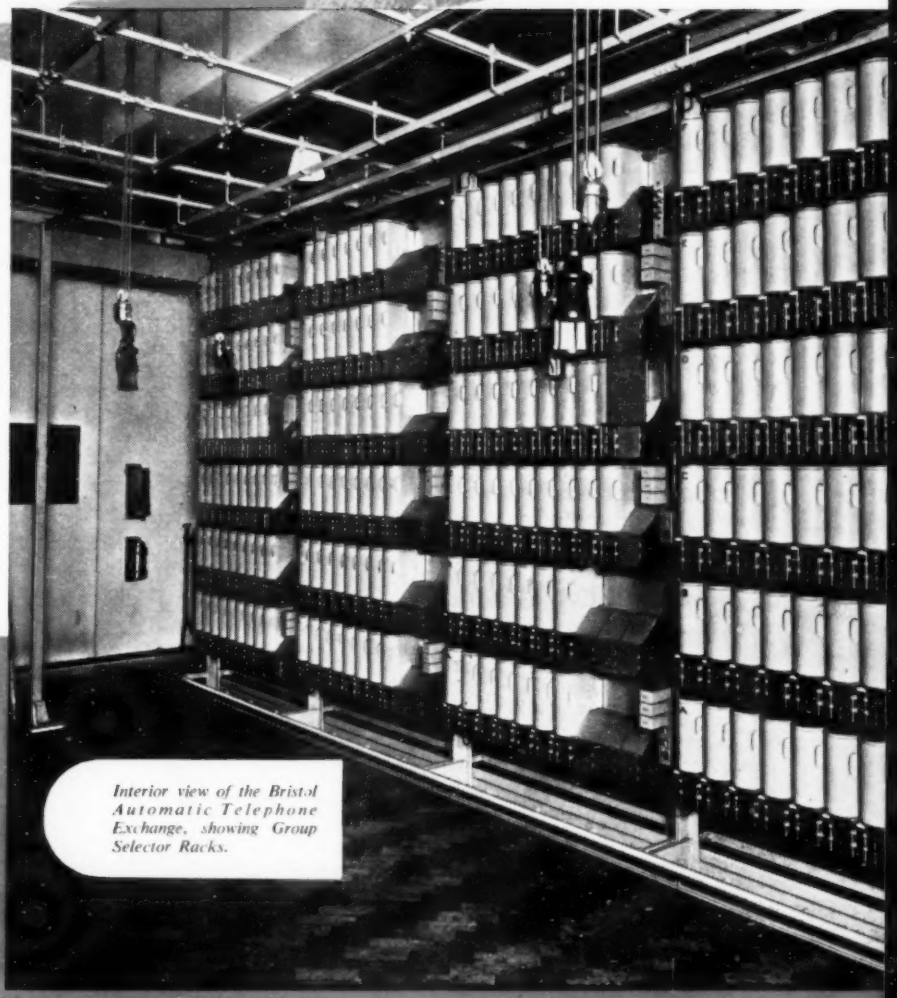


Bristol-

The River Avon flowing through the town forms the county boundary between Somersetshire and Gloucestershire; in addition to being, in result, partly situated in each, Bristol is a County in its own right—a tribute to its ancient importance. Crossing the Avon gorge at Clifton is the magnificent suspension bridge, nearly three hundred feet high and beneath it, beside the river, runs the fine Portway road linking Bristol to Avonmouth. Architecturally famous are the parish church of St. Mary Redcliffe, the Cathedral, and many other churches and old buildings, some now serving as business places. The Cabot Tower commemorates the voyages of John and Sebastian Cabot, whilst other buildings recall the romantic Guild of Merchant Venturers. In Bristol University hangs "Great George," a massive bell owing its title to three namesakes: King George V who declared the buildings open, Sir George Oatley, the Architect, and Sir George Wills who, with his brother Mr. Henry Wills, defrayed their cost.

Important as a manufacturing town and as a seaport, with fine town buildings and suburbs situated amongst the lovely Downs, Bristol has a great past and more important still, a great future.

telecommunications



Interior view of the Bristol Automatic Telephone Exchange, showing Group Selector Racks.

Strowger Automatic Telephone Equipment installed to provide telephone service in Bristol and throughout the surrounding district has two points of interest. First, it linked subscribers in the largest telephone area in the West of England —which, incidentally was the first in Europe to instal C.B. Manual equipment—and second, it utilised for the first time in Great Britain the standardised single sided rack equipment having channel type shelves. Use of these racks enabled much improvement to be effected in the cabling, wiring and trunk grading arrangements, due to the introduction of several new types of frames, such as the trunk distribution frame, meter strip frame and line I.D.F. The racks were completely wired and equipped with Strowger selectors or relay groups and tested in the factory prior to despatch and, when placed in position on site, were thus ready for cabling.

Operating on the Strowger non-Director five-digit system, the complete network consists of sixteen exchanges and of these ten were initially installed and cut-over in November 1931 with the remaining six following as the programme of conversion from manual working proceeded, later for an ultimate total of some forty-five thousand subscribers' lines. An auto-manual exchange was also located in the "Central" Exchange building to handle all auto-manual, manual—manual and long distance trunk traffic and directory enquiries for the area.

AUTOMATIC TELEPHONE AND ELECTRIC CO. LTD.

NORFOLK HOUSE, NORFOLK ST., LONDON, W.C.2
Temple Bar 9262 Cables: Autelco, London
STROWGER WORKS, LIVERPOOL, 7, ENGLAND

ATM
REG'D. TRADE MARK

Suppliers' News Briefs

Loren Berry and Gustav Hirsch Enter Broadcast Field

Two important figures in the Independent telephone industry, Loren M. Berry, president of L. M. Berry & Co., telephone directory firm, and Col. Gustav Hirsch, leading telephone consulting engineer of Columbus, O., who has financial interests in a number of Independent companies in the Middle West, have entered the FM broadcasting field. They were listed by the FCC as each having 25% of the stock of the Skyland Broadcasting Corp. station at Dayton, O., which was given a conditional construction permit. The station will use FM channel 284, 101.7 mc, with 20 KW power and will have a 500-foot antenna. They will be associated with two other leading Dayton businessmen.

◆

American Relay Purchased By Chicago Manufacturer

Purchase of American Relay & Controls, Inc., 2555 West Diversey Avenue, Chicago, makers of relays, switches, and specialized controls, by David T. Siegel, prominent Chicago manufacturer, was announced recently. The firm has also moved to a new location at 4900 West Flournoy Street, Chicago 44, Illinois.

◆

Leich Announces Revolutionary New Telephone Instrument

The Leich Electric Company, Chicago, Illinois, recently announced its new telephone instrument to the Independent telephone industry. The main feature of the new Leich telephone is that the same telephone serves as a desk or a wall model; using the same base and the same case or housing.

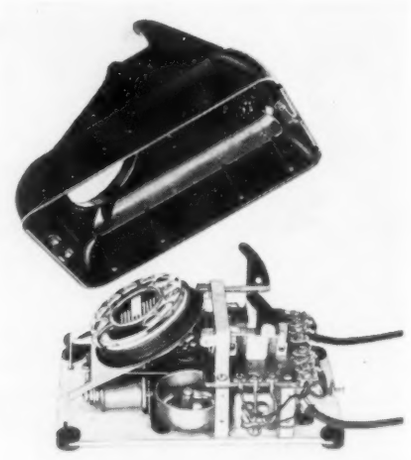
The Leich company states that there is nothing to change, add or buy. If the telephone is to be a desk model, it is placed on the desk. If it's a wall model, it is mounted on the wall. On a telephone equipped with a dial the change from wall to desk model, or vice versa, is easily made by loosening two screws and turning the dial around

The new Leich telephone above used as a desk model. The same telephone can be used as a wall telephone. There are no cord connections (see photo to right) in the cover of the new Leich telephone.

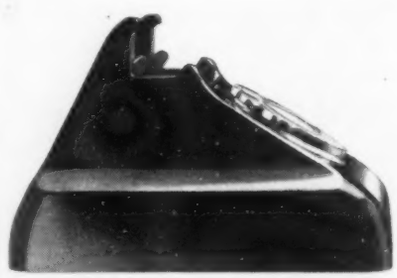
in the case. This feature, as Leich points out, enables the telephone company to stock but one telephone when previously it was necessary to have different housings for wall telephones. The company also pointed out that this feature should be helpful on actual installation work, as it will no longer be necessary to know ahead of time which type of instrument is preferred by the subscriber.

A compete new hookswitch arrangement makes it possible for the one telephone to be both a wall and desk model. The two hookswitch levers protrude at a 45 degree angle from the corner of the saddle. In this way, positive operation of the hookswitch is assured whether the telephone is sitting down normally on the table, or turned up endwise and mounted on

Leich's new telephone used as a wall model.



the wall. The new case has been designed so that, on dial models, the dial is mounted on an angle. This angle mounting permits the dial wall tele-



Side view of Leich telephone without handset. Notice angle of hookswitch levers. In this view, it is a desk telephone. Turn the magazine to the left, 45 degrees, and you see the telephone as a wall model, with the hookswitch levers still in the same operating position.

phones to be mounted at desk height, yet the dial can be read and operated from either a sitting or standing position.

The telephone is arranged for mounting tubes for tube ringing under the connecting block.

A new, smaller induction coil and new hermetically sealed condenser are incorporated in the new Leich telephone. All connections, replacements, circuit changes, can be made with a screwdriver. The transmitter and receiver are of the capsule type.

The Bakelite case can be removed

MEREDUC
TRADE MARK

PRESSURE TREATMENTS of Southern Pine Poles, Crossarms, Conduit, Cover Plank, Ground Wire Moulding with No. 1 Creosote Oil or Pentachlorphenol are carried in stock permitting prompt shipments of carload and less than carload orders. Mailing address: P. O. Station "A", Atlanta, Ga.

WILLIAM C. MEREDITH COMPANY, Inc.

Treating Plant: East Point, Ga. — Mailing Address: P. O. Station "A", Atlanta, Ga.

for TELEPHONE CORD QUALITY

ECONOMY AND SERVICE

Conductors in Commercial Cords are made of six tinsel threads twisted together over a 10-3 ply cotton thread. This assures long life and noise-free conductivity. Each conductor is also insulated to give maximum protection against moisture.

It's such quality construction that is making so many independent telephone companies exclusive users of Commercial Cords. Try them next time you order.

Commercial Cord
AND SUPPLY COMPANY, INC.
26 East Main Street
Clifton Springs, N. Y.

*Order by Code Number or Submit Sample

INVEST YOUR "PIN MONEY" IN THE BEST

LOCUST PINS

Locust wood is practically impervious to decay and is impenetrable to moisture. Because of its close-grained hardness locust can be machined into strong, long lasting pins of standard specifications that can be counted on to retain their size and shape.

OAK BRACKETS

Oak pole brackets of unquestioned quality are in demand now as never before in the face of the qualifications necessary in the equipment and materials needed today to "keep 'em talking." Present day maintenance and repair have every reason to demand and get only the best.

GLASS INSULATORS

Research and experiment have produced in Hemingray insulators a glass insulator that is better than any ever before offered.

Non-porous, non-deteriorating, uniform coefficient of expansion and high mechanical as well as high dielectric strength are some of the many qualities that rank Hemingray the "best on the line."

BUCKEYE TELEPHONE and SUPPLY CO.
COLUMBUS 6, OHIO

New Products Showcase

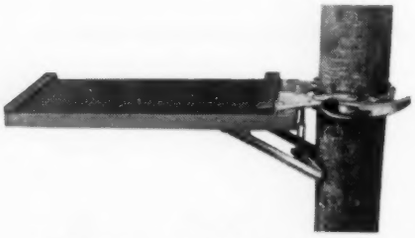
For further information on New Products presented in this department, write New Products Editor, Telephone Engineer Publishing Co., 7720 N. Sheridan Road, Chicago 26, Ill. All inquiries will be answered promptly.

Ingersoll-Rand's new universal electric, all-purpose Impact Tool. Using standard attachments, it will apply and remove nuts, drill, ream, tap, drive and remove screws, drive and remove studs; extract broken cap screws and studs; run wire brushes; do hole saw work; drill brick masonry —drive wood augers.

• • •

Speed-o-matic electric torqueless, impact Nut Setter is torqueless; manufacturer claims it will not twist in operator's hands when nut becomes tightened. This feature means maximum ease of operation with minimum fatigue to operator. It operates at high speed, driving nut or bolt 1750 R.P.M. at free speed.

• • •



Lightweight utility platform, manufactured by A. B. Chance Campany, is designed for use in substations or on poles where space is limited or when only a small working area is required.

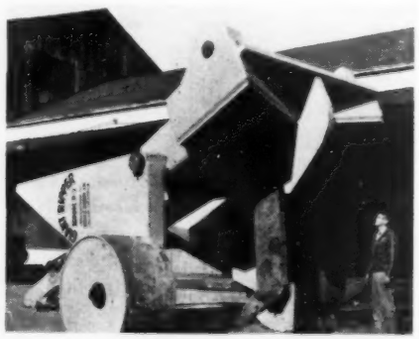
The board is 11"x 30", 1-⅝" thick, surfaced with Griptread, which prevents slipping. Platform is quickly applied to the pole.

• • •

Syntron Company announces the addition to their line of paper joggers and vibratory packers of a new small model with built-in variable control power, a 7" by 10" wooden deck standing 4½" high and weighing but 13 pounds. The portable piece of equipment can be used for aligning quantities of invoices for filing.

• • •

New JOIC all-angle drill can drill around corners, in tight points, at odd angles or drill a series of holes at exactly the same height. Unit offers every feature of standard ¼" hand drills.



A new 17-ton custom built Giant Ripper, Model R-2, is announced by Soule Equipment Co. Strong enough to take the pull of three or four 104 to 150 h.p. tractors, the ripper can penetrate six feet of hard ground.

entirely by loosening one screw. There are no cord connections in this case. The dial is on a bracket which flips open, exposing the back of the dial, and making the ringer accessible for adjustment. This bracket is slipped into two holes in the base plate, which makes converting a manual telephone to dial a simple matter.

Both dial and manual types of these telephones are now in production.

A catalog describing the new Leich telephone is now available. Copies may be had by writing Leich Sales Corporation, 427 West Randolph Street, Chicago 6, Illinois.

◆

Bennecoff Named Manager FTR Transformer Sales

H. G. Bennecoff, sales manager, wire transmission division, Federel Telephone & Radio Corporation, Clifton, New Jersey, affiliate of International Telephone & Telegraph Corporation, has been appointed manager of FTR's transformer sales, in addition to his other duties.

H. G. BENNECOFF

Mr. Bennecoff has been active in communications and carrier systems sales since joining Federal in 1944 and has been instrumental in the installation of FTR's telegraph and telephone transmission systems by railroads, pipeline companies, utilities and independent telephone companies.

He is on the executive committee of the Railway Telephone & Telegraph Association and associate member of the Communications & Signal Sections of the Association of American Railroads. He also is a member of the Petroleum Electrical Supply Association and several Independent telephone associations of various states throughout the country.

Mr. Bennecoff was formerly associated with the Bendix Aviation Corporation

Coordinated TO SERVE YOU ANYWHERE!

The **International AUTOMATIC ELECTRIC** *Group* is the engineering and distributing organization for four outstanding telephone manufacturing organizations, united under one banner for the production of communication apparatus of highest quality. From these manufacturers come Strowger Automatic telephone equipment, high quality wires and cables, and telephones that have won world-wide approval from operating companies and administrations.

The International Automatic Electric Group offers also its technical skill and operating experience for the engineering, financing and installation of telephone plants of any size. Here, then, is a complete service which can be exactly adapted to your specific needs. We shall be glad to show how we can serve YOU.

International AUTOMATIC ELECTRIC Corporation

1033 West Van Buren Street, Chicago 7, U. S. A.

AUTOMATIC ELECTRIC SALES COMPANY, S. A.
22 Rue du Verger Antwerp, Belgium

Export Distributors For:
AUTOMATIC ELECTRIC COMPANY, Chicago, U. S. A.
PHILLIPS ELECTRICAL WORKS LIMITED, Brockville, Canada
AUTOMATIQUE ELECTRIQUE, S. A., Antwerp, Belgium
AUTELCO MEDITERRANEA, S. A. T. A. P., Milan, Italy
and other manufacturers
Selling Companies and Agents Throughout the World

ACORN INSULATED WIRE

TODAY TELEPHONE WIRE has to be tough

Many years of specialization in the manufacture of communication wire has built a performance record for Acorn Drop Wire.

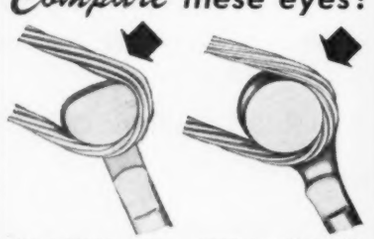
ACORN INSULATED WIRE COMPANY, INC.
225 King Street, Brooklyn, N. Y.
LEICH SALES CORP., 427 W. Randolph St., Chicago
LINDSAY SUPPLY CO., 4815 Superior Ave., Cleveland

ACORN'S exclusive Carton packaging preserves carefully developed QUALITY until installed . . .

Drop Wire—Bridle—Interior—Tree—Ground—Switchboard—Pothead—Cable Terminal—Instrument—Fixture—Buried Wire

CHANCE Improved THIMBLEYE Gives GREATER Protection to Guy Strand

Compare these eyes!



OLD STYLE EYE
Notice the strain placed on guy strand when used at angle with old style eye.

NEW THIMBLEYE
The new Chance Thimbleye protects the guy strand from strain at any angle.

FULL ROUNDED EYE . . .
No Kinking at Any Angle
GROOVED to Fit Guy Strand

Chance Thimbleye Anchor Rods, and Guying Fixtures, the FIRST choice of users for many years, have recently been improved by Chance engineers. The redesigned eye forms a perfectly shaped "Thimble" and the sidewalls and groove of the eye extend around the head of the rod. This keeps the strand from flattening under tension, preserves its cylindrical shape and prevents it from kinking at any one point. The sidewalls of the groove are formed to fit snugly around the guy strand, preventing it from flattening under tension.

You will instantly see that the newly designed eye gives greater protection to guy strands than the old style eye.

The Improved Thimbleye is available in threaded rods, Never-Creep rods, and the complete line of guy fixtures.

For greater line security, specify Chance Thimbleye Anchor Rods and get this additional protection. Order through your regular source of supply.

C473-B

A·B·CHANCE CO·
CENTRALIA, MISSOURI · SAN FRANCISCO, CALIFORNIA
ABC INDUSTRIES

and during the war was captain of his own ship, as a member of the Coast Guard Reserve. He is a native of Philadelphia and attended the University of Pennsylvania.

◆

Bluefield (W. Va.) Telephone Co. Announces Improvement Program

The Bluefield (W. Va.,) Telephone Company, an affiliate of the Central Telephone group, has announced an improvement program of its plant which will total around $350,000. In Minnesota, another Independent, the Dunnell Telephone Co., announced plans for a $34,000 automatic system program.

◆

New System For Adrian, Mich.

Construction in Adrian, Mich., of a new exchange building by the Central Telephone Company will be followed by installation of automatic equipment, replacing the present manual system.

◆

Automatic Announces Organization Changes

Appointment of G. K. Beare as production manager of Automatic Electric Company, effective January 8, was announced recently by H. F. Lello, vice president and general manager. Mr. Beare was formerly general commercial manager, and general manager of the company's international affiliates, and in his new position has responsibility for all production operations, with general supervision over the activities of the factory manager, the superintendent of engineering, the production coordinator, and the superintendent of installation. K. W. Grayhill, as chief engineer, continues policy and technical direction of the engineering department.

Succeeding Mr. Beare in his former dual post, R. W. McMichael, formerly executive assistant to the vice president and general manager, has been appointed general commercial manager and general manager of the company's international affiliates. As general commercial manager, he has supervision over all matters having a commercial aspect and relating to sales promotion, advertising, engineering and production; as well as over the handling of trade agreements, negotiations and contracts relating to the company's operations throughout the world.

As general manager, international affiliates, Mr. McMichael has responsibility for the administrative management of the manufacturing and sales

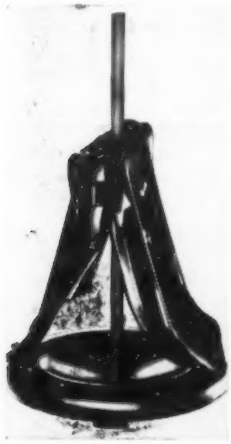
subsidiaries of Automatic Electric Company and International Automatic Electric Corporation in Canada, Belgium, Italy, and Australia.

◆

Pieper-Lillard Announces New Expanding Anchor

Pieper-Lillard, Inc., have announced the design and production of a new all-steel, two-piece expanding earth anchor. The accompanying photograph shows the unique one-piece, truss type, expanding blades, heavily ribbed at point of fulcrum.

A heavy reinforced base plate serves as the member upon which these one-piece blades are expanded out to a point where when fully spread shoulders in each wing engage the edges of the plate firmly positioning them. In fabricating, a steel is used with qualities of greater resistance to bending and corrosion.



The blades are attached to the base plate with sheer bolts which are severed with the first blow of the spreader. Successive blows of spreader are directed onto upper edges of these sharp blades forcing them easily through a natural arc fully into undisturbed earth. No arms, plates, joints or pinned hinges are necessitated in this anchor design.

The anchor is approved by and many thousands are already in service on private utilities.

◆

Miles Reproducer Co. Develops "Telemike"

Now, when Dad, brother or sister telephones home the entire family can listen to their voices through the radio loud speaker with a Miles "Telemike" —a newly developed Midget Inductor unit which requires no electrical connection with the telephone or telephone wire.

Telemike is a midget Inductor unit measuring only ¼" in thickness and 1" in diameter and fits over the outside of earpiece of the standard desk or wall type telephone. It may be placed inside or underneath of the desk cradle type telephone or may be concealed inside of the ringer box on wall.

Continuous Training | FOR PROGRESS

MANY OF the larger companies are now setting up "continuous" plant training programs designed to train the new men needed in the larger organizations and for occasional "refresher" courses for the old timers. These courses deal with new developments and improved methods as well as instruction on standard established practices. It has been definitely established by progressive companies that a continuous training program will pay for itself many times over in improved working efficiency. The present high level of wages makes this more true than ever.

The first step in setting up a continuous training program is to select one or more likely instructors from the employee or supervisor groups. The instructors, with the assistance of top management, can lay out a long term training program, and work up methods of obtaining employee interest and cooperation.

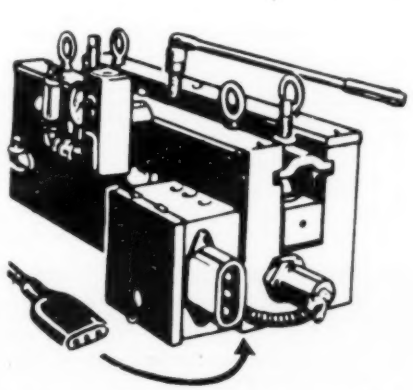
Thought should be given to the use of "activated" methods of presenting instruction on various subjects as these will aid greatly in getting maximum benefit from the training efforts. Equipment "board displays", on which wired components are attached in such manner that their action is readily observable by the class, represent one type of teaching aid that will help put the training program across. In addition to the inside classroom instruction, some companies have set up short poles equipped with standard cable, crossarms, open wire and drop construction. This is used in training novice linemen or for developing new outside plant techniques. These poles are usually set up in the company pole yard or back of the exchange building.

Visual training aids can be used to advantage by making 35mm slides of various construction operations. With radio entering the picture, the need for more and better training is becoming more pronounced. The alert telephone executive will have the establishment of a comprehensive, well thought out plant and commercial training program on his 1948 agenda.

Electrical Cable Vulcanizer Keeps Cable Upkeep Down

The Mines Equipment Company has announced that its line of 1948 "Rubber Cable Vulcanizers" are ready for distribution. Based on 21 years of manufacturing experience, the vulcanizer provides a simple, easy and inexpensive means of replacing insulation on all types of rubber covered flexible cables; making broken or damaged sections good as new.

Two styles are available, both electrically heated. One applies heat, thermostatically controlled, directly to its molds. The other heats its molds by automatically controlled steam pressure. Both models are extremely simple to operate.



New cable vulcanizer, developed by Mines Equipment Company.

The manufacturer states that among the many advantages of the vulcanizers are:

(1) Longer cable life—quick, easy on the job vulcanized repairs of bad spots in jacket insulation eliminates necessity of scrapping lengths of otherwise good cable.

(2) Fewer costly shut-downs—in most cases cable costs are the smallest consideration in replacements. New cable deliveries are generally slow and idle machines mean loss of production. In addition inferior splices usually result in recurrent repairs.

(3) Better performance—when the curing process (requiring only a few minutes) is complete, vulcanized repairs closely approach the original cable in appearance and performance. Thus properly vulcanized splices actually protect personnel and equipment from dangers attending electrical disorders.

For complete details write for Mines Equipment Company's new

(Please turn to page 84)

The Clearing House

For the Convenience of readers of Telephone Engineer

Chemical Dehydrators

Automatically controlled, using flake calcium chloride for preventing dampness and condensation in automatic totally enclosed telephone exchanges.

The H. J. Kaufman Co.
13215 Roselawn Ave., Detroit 4, Mich

Want A Better Job In
TELEPHONE SWITCHBOARD INSTALLATION WORK?

Stromberg-Carlson Company has a number of excellent opportunities for experienced installers on manual and dial central office switchboards. Must be available to travel. Good compensation and liberal weekly expense allowance with one of the nation's oldest, top ranking telephone manufacturing companies. Apply, giving full experience particulars, to: Installation Manager, Stromberg-Carlson Company, 100 Carlson Road, Rochester 3, New York.

Want Ad Rates

THE RATES for this department are as follows: 15c a word, cash with order, please. Box number service if desired. We Run Positions Wanted Ads for Veterans Free of Charge. For display advertisements ask for rate card. Address all correspondence to: TELEPHONE ENGINEER PUBLISHING CORPORATION, 7720 Sheridan Road, Chicago 26, Illinois.

Reconditioned Kellogg No. 2000 Type Relays

Spring Combinations

2002	2007	2023	2037	2064
2003	2019	2027	2043	2077
2004	2020	2029	2046	2089
2006	2021	2031	2048	2091

Coils

SB	SAD	SEK	TJ	CZ	CDM
SC	SAH	SEM	TX	CAA	CDP
SE	SAP	SEQ	TY	CAB	CDX
SF	SAQ	SFU	TAV	CAJ	CEA
SH	SBG	SGF	TAY	CBE	CEB
SJ	SBH	SGH	TBL	CBM	CEC
SL	SBX	SGJ	TBN	CBY	CEQ
SN	SDE	TB	TBQ	CCC	
SP	SDF	TC	TBU	CCD	
SU	SDG	TE	CB	CCG	
SW	SDT	TF	CU	CCN	
SAC	SEB	TG	CY	CCV	

Many other codes in smaller quantities. Complete relay assemblies, mountings and covers.

BUCKEYE TELEPHONE & SUPPLY COMPANY
COLUMBUS 6, OHIO

CLASSIFIED ADS

Help Wanted

HELP WANTED: Man to rebuild small switchboards. Steady employment, good wages. Telephone Repair & Supply Co., 1760 Lunt Ave., Chicago 26, Ill.

HELP WANTED: Experienced telephone linemen and installer-repairmen for work in Wisconsin or Illinois. Applicants with adequate experience and qualifications will be given immediate consideration for line crew construction foremen. Liberal vacations, pension plan, other benefits. State age, experience, dependents, and wages expected. Enclose recent photo. COMMONWEALTH TELEPHONE CO., Madison, Wisconsin.

Wanted to Buy

WANTED: Two position, full multiple PBX switchboard, wired for approximately 200 lines and equipped for approximately 140 lines (line relay type). In replying, please give full description as to type, capacity, trunks, and cord circuits, OHIO CONSOLIDATED TELEPHONE CO., 824 Seventh St., Portsmouth, Ohio.

Position Wanted

POSITION WANTED: Veteran, six years experience telephone accountant and auditor. Desires top accounting job with Class A company. Will relocate. Best references. Box No. 8540, c/o Telephone Engineer.

POSITION WANTED: Ex-serviceman, Age-29, 5½ years experience in automatic exchange, married, 2 children. Wife can also operate switchboard. Free to travel anywhere. Write Box No. 8537.

For Sale

Linemen's Tool and Safety Belts

3" Body Tool Belt, Multiple Strength Webbing, Tested "DEE" Rings, Pliers Holster, Tool Pockets, Tape Hook, Adjustable.
2" Safety Strap of 3 Ply Webbing, 70" Long, Adjustable Slide, Duck-Bill Stirrup Snaps.
Copper-Riveted Strain Points, Rust Proof Metal Parts.
New Army Surplus—Unused—in Sealed Unit Cartons.
Cost Government about $9.00 Each.
Our Price $2.65 for Complete Set, (Belt & Strap) F.O.B. Brooklyn.
"UNBEATABLE VALUE!"

J. J. HAIGNEY
78 Sherman St. Brooklyn 18, N. Y.

FOR SALE: 110 station Magneto exchange located in Southwest Missouri town of 400 population. Opportunity to triple business. Exchange in fair condition. Price includes good 7-room modern home, 2-car garage, and 4 lots. Gross income $5,000. Selling because of other business. Price $7,000. $3,653.18 cash, balance G. I. loan. Contact WACO TELEPHONE CO., Waco, Missouri.

FOR SALE: Complete common battery Desk Stands, W.E. Co. and Kellogg with S.L. or frequency ringers. 30-42-54-66 cycle, $2.00 each. Also several hundred Kellogg 801 Wood Wall Telephone complete. 30-42-54-66 cycle at $1.00 each. All f.o.b. Platteville, Wisconsin. PLATTEVILLE TELEPHONE CO., Platteville, Wisconsin.

FOR SALE: Electric Products diverter pole generator. Motor 220 volt, 3 phase, 60 cycle, 7½ HP. generator 47½ volts 75 amps direct coupled. Replaced by larger machine. Two complete No. 19 Kellogg pole changers, 16-30-42-54-66 cycles primary 24 volts secondary 100 volts. The Ashtabula Telephone Co., Ashtabula, Ohio.

For Sale

FOR SALE: Electronic two way speakers, hear and reply as far as 200 feet from speakers, will operate through telephone cables. Master and speaker, 100 feet shielded weatherproof wire, $69.00 unconditionally guaranteed. ELECTRONIC EQUIPMENT CO., Rte 8 Box 59A, Des Plaines, Ill.

FOR SALE: Handsets W.E. A.E., Kellogg, rebuilt and guaranteed to look and work like new . . . $4.50 each. W.E. F-1 cradle desk sets with dial and handset etc., rebuilt like new . . . $14.50 each. Main Frame, relays, coils and switchboard equipment of all makes. NORTHERN ELEC. CO., 667-6th Ave., Brooklyn, N.Y.

USE
TELEPHONE ENGINEER
AND MANAGEMENT'S
CLEARING HOUSE
To locate workers—jobs—merchandise. A small ad covers the field.

A NEW, IMPROVED—

UNIQUE SPLICERS FURNACE

Melts 50 Lbs. of Solder in 10 Minutes

Basically the same fine furnace used by larger Utilities for 20 years - Now with

- **FINE FLAME CONTROL**—keeps solder at "just the right temperature."
- **"QUICK CHANGE" GENERATOR**—removed and replaced in 60 seconds.
- **WIND-PROOF**—housing shields generator—No extra shield is needed.

Additional Features: Long-life figure "8" generator—with orifice scraper. Rugged semi steel top plate. Powerful pump. 16 gauge welded steel tank with bottom shock ring. Size 8" x 13". Weight—15 lbs. Popular size for 6", 7", and 8" pots.

No. 55-I—KEROSENE No. 53-I—GASOLINE

If clear white gasoline is hard to get, order the Kerosene Furnace. You'll like it.

We Invite An Approval Test

UNIQUE MANUFACTURING CO., INC.
221 W. Walton St., Chicago 10, Ill.

STANDARD ART CODE
For
Streamline Telephone Numbers
Permits by—Rachel Harriet Stotts,
Box-371. Chariton, Iowa. U.S.A.

Telephone Engineers

CYRUS G. HILL
ENGINEERS
ALLEN K. HAMILTON
Plant—Traffic—Commercial
Valuations and Original Cost
231 S. La Salle St., Chicago 4

MANFRED K. TOEPPEN
ENGINEER
Consultation - Investigation - Reports
639 South Spring Street, Los Angeles, Calif.
261 Broadway, New York 7, N. Y.

SLOAN, COOK & LOWE
CONSULTING ENGINEERS
Suite 1344 120 South LaSalle Street
CHICAGO
Appraisals—Original Cost Studies
Depreciation, Financial, and Other
Investigations

JAY G. MITCHELL
Public Utility
Operating and Management
Economics
P.O. Box 523 Evanston, Ill.

Engineering Service Associates
Consultants
Plant — Engineering — Traffic
Mobile Radio — Carrier Systems
Nunn, Colorado

Cedar Poles
MAC GILLIS & GIBBS COMPANY
Wells Bldg.) Milwaukee 2, Wis.
★ ★
Northern White and Western Red
Cedar Poles—Plain or Butt-Treated

Write Today for Your Copy . .

Bashlin's new bulletin giving full details on Linemen's Safety Equipment is ready for you . . . a complete line from which to choose, and every one a champion. Write today!

W. M. BASHLIN CO. – Grove City 1, Pa.

finishing cloths

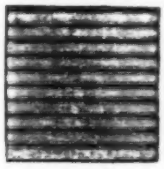
packed in cartons

CABLE-SPLICERS WIPING CLOTHS

Wipe Perfect Joints

on lead-sheathed cable splices

catch cloths



sealed in wax paper wrappers

GEO. E. WILLIAMS, *Mfg.*

3035 Aldrich Avenue So. Minneapolis 8, Minn.

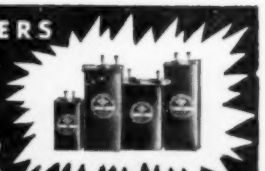
USE AMCON AMERICAN TELEPHONE and TELEGRAPH CONDENSERS

. . . Dependable!

AMERICAN CONDENSER CO.

Specification sheets on request

4410 NO. RAVENSWOOD AVE., CHICAGO 40, ILLINOIS



ALPHADUCT WIRES

FOR *All* TELEPHONE REQUIREMENTS

LONG LIFE

Neoprene Jacketed
Drop and Bridle Wire

Weatherproof Braided Drop and Bridle
Interior - Tree - Ground - Switchboard -
Pothead - Cable Terminal - Instrument

Manufactured and Tested to Rigid Specifications

ALPHADUCT WIRE & CABLE CO.

Milltown, New Jersey **Telephone: Milltown 8-0030**

FROM THE COMPLETE LINE OF OLIVER POLE LINE MATERIALS

OLIVER TELEPHONE LINE PINS

The Oliver pins illustrated are made for use with standard insulators having 1-inch diameter pin hole. They are forged from high carbon open hearth steel, and hot dip galvanized. Wood cobs are of air-dried oak, boiled in paraffine.

Makers of Pole Line Materials Since 1894

OLIVER
IRON AND STEEL
CORPORATION

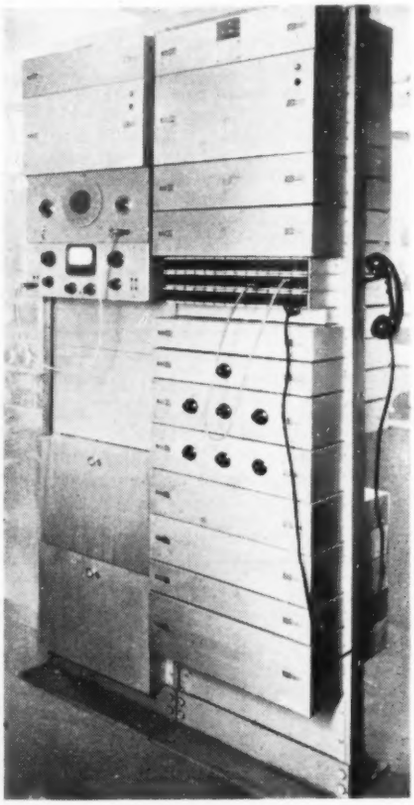
South Tenth and Muriel Sts. · Pittsburgh 3, Pa.

Cable Vulcanizer Bulletin No. RV-106, Mines Equipment Company, 4215 Clayton Ave., Dept. 24, St. Louis 10, Mo.

◆

Lenkurt Introduces New Eleven-Channel Radio Carrier

Lenkurt Electric Company, San Carlos, California, prominently identified with the manufacture of wire-line carrier-telephone systems, has introduced a new system designed to provide as many as 11 duplex voice channels on a two-way radio circuit. Referred to as Type 42, the equipment was developed to answer the need for multichannel radiotelephone link installations such as those between islands in Pacific areas where cables are economically impracticable. However, the equipment offers similar advantages on radio circuits of a wide variety.



Lenkurt 11-channel radio carrier.

On installation, carrier equipment is required only at the terminals of the radio link—intermediate repeater stations involving radio-frequency relaying only. Carrier channels can, however, be terminated or connected to side circuits at any repeater point with appropriate equipment.

Of special interest is the design feature which permits a 15-kc program channel with one to eight added carrier channels. This provides order wire circuits; channels for facsimile; circuits for telegraph; or telemetering or remote over studio-transmitter links.

Index to Advertisers

Acorn Insulated Wire Co. 80
Alphaduct Wire & Cable Co. 84
American Coach & Body Co. 8
American Condenser Co. 83
American Creosoting Co. ..... —
American Cross-Arm, Inc. 71
American Steel & Wire Co. ..... —
American Electrical Heater Co. ... —
American Tel. & Tel. Co. 22, 23
Armstrong Cork Co., Whitall Tatum Glass Insulator Dept. 59
Automatic Electric Co. ..... —
Automatic Electric Sales Corp. 44, 45, 49, 53, 62, 69, 72
Automatic Telephone & Electric Co., Ltd. 74, 75
Barco Manufacturing Co. ..... —
Barnstead Still & Sterilizer Co. .... —
Bartlett Mfg. Co. ..... —
Bashlin Co., W. M. 83
Berry & Co., L. M. ..... —
Bethlehem Steel Corp. ..... —
Biddle Co., James G. ..... —
Blackburn Specialty Co. ..... —
Brach Mfg. Co., L. S. 54
Brown Wood Preserving Co. ..... —
Buckeye Telephone & Supply Co..77, 82
Buckingham Mfg. Co. 48
Cable Spinning Equipment Co. ..... —
Calculagraph Co. ..... —
Carpenter Mfg. Co. ..... —
Chance Co., A. B. 80
Chapman Chemical Co. ..... —
Churchill Cabinet Co. 70
Claridge Hotel ..... —
Clayton & Lambert Mfg. Co. ..... —
Coffing Hoist Co. ..... —
Colfax Lumber & Creosoting Co., Inc. ..... —
Collyer Insulated Wire Co., Inc..... —
Columbia Steel Co. ..... —
Commercial Cord & Supply Co. 77
Connecticut Tel. & Elec. Div. 51
Continental Farm Machine Co. ..... —
Cook Electric Co. 71
Cope, T. J., Inc. ..... —
Copperweld Steel Co. 7, 59
Cummings Machine Works ..... —
Defiance Alloyed Products Co., The. —
Dicke Tool Co. ..... —
Dillon & Co., Inc., W. C. ..... —
Dow Chemical Co., The ..... —
Drake Electric Works, Inc. ..... —
du Pont de Nemours, E. I. Co., Inc... —
D-X Products Co. ..... —
Ederer, Inc. ..... —
Electric Products Co., The 5
Electric Storage Battery Co. 3
Engineering Service Associates ... 83
Estwing Mfg. Co. ..... —
Federal Tel. & Radio Corp. 73
Forged Steel Products Co. ..... —
Four Wheel Drive Co., The 17
G & W Electric Specialty Co., Inc... —
Gary Services & Investment Co..... —
General Cable Corp. ..... —
General Electric Co. ..... —
General Insulated Wire Works, Inc. 85
General Telephone Directory Co..... 2
Genwilmar, Inc. ..... —
Gould Battery Co. ..... —
Graybar Electric Co. 56
Great American Industries ..... —
Habirshaw Cable & Wire Co. ..... —
Hallicrafters Co., The ..... —
Hammond Drierite Co., W. A. ..... —
Hatheway Patterson Co. ..... —
Highway Trailer Co. 87
Hill, Cyrus G. 83
Hirsch Organization, Gustav 60
Homelite Corp. ..... —
Hubbard & Co. ..... —
Hykon Mfg. Co. ..... —
Independent Telephone Pioneer Association ..... —
Independent Telephone Repair Co.. —
Indiana Steel & Wire Co. 6
Industrial Instruments, Inc. ..... —
International Automatic Electric Corp. 79
International Harvester Co. 24
Jaques Power Saw Co. ..... —
Joslyn Mfg. & Supply Co. ..... —
Ka-Mo Tools, Inc. ..... —
Kaufman Co., H. J. 82
Kearney Corp., Jas. R. ..... —
Kellogg Switchboard & Supply Co. 18, 19, 20, 21, 64, 65
Kester Solder Co. ..... —
Kennecott Wire & Cable Co. 71
Klein & Sons, Mathias 50
Koiled Kords, Inc. 12
Kwikheat Soldering Irons ..... —
Leeds & Northrup Co. ..... —
Leich Sales Corp. 40, 41
Lenz Electric Mfg. Co. ..... —
Loomis Advertising Co. 47
Lorain Products Corp. 13
MacGillis & Gibbs Co., The 83
Marmon-Herrington Co., Inc. ..... —
Meredith Co., Inc., Wm. C. 77
Miller Mill Co., T. R. ..... —
Mines Equipment Co. ..... —
Mitchell, Jay G. 83
Moss Tie Co., T. J. 59
Motorola, Inc. ..... —
Murdock, Wm. J. ..... —
Mutual Liquid & Gas Co. 55
National Carbon Co. ..... —
National Electric Prod. Co. ..... —
National Fireproofing Co. 53
National Telephone Supply Co. .... —
Neale Construction Corp. 85
Newman Mfg. & Sales Co., Inc..... —
Newman Mfg. & Sales Co., Inc. .... —
North Electric Mfg. Co. 88
Northwestern Clock Co. ..... —
Oliver Iron & Steel Corp. 84
Owens-Illinois Glass Co. ..... —
Page & Hill Co. 69
Paragon Electric Co. ..... —
Plastic Wire & Cable Corp. ..... —
Premax Products ..... —
Ray-O-Vac Co. ..... —
Raytheon Mfg. Co. 33
Rebuilt Electric Equipment Co. .... —
Reliable Electric Co. 16
Remler Co., Ltd. ..... —
Rhodes, M. M. & Co. ..... —
Roebling's Sons Co., John A. ..... —
Roll-A-Reel ..... —
Runzel Cord & Wire Co. 62
Schauer Machine Co., The 58
Seymour Smith & Sons, Inc. ..... —
Shelley Construction Co. 86
Sherron Metallic Corp. ..... —
Sloan Coofle & Lowe 83
Sound Equipment Corp. ..... —
SoundScriber Corp. 11
Stromberg-Carlson Co. 14, 15, 58, 59, 70, 71
Sturgis Posture Chair Co. ..... —
Suttle Equipment Co. 86
Specialty Device Co. ..... —
Stotts, Rachel 83
Superior Mfg. Co. ..... —
Sylvania Electric Products, Inc. ... —
Syntron Company ..... —
Taylor-Colquitt Co. ..... —
Telephone Advertising Inst. 53
Telefon Fabric Automatic a/s ..... —
Telephone Answering & Recording Corp. ..... —
Telephone Engineer Pub. Corp. 54
Telephone Repair & Supply Co. 54
Telephone Sales & Service Co. .... —
Telkor, Inc. ..... —
Templeton, Kenly & Co. ..... —
Tennessee Coal, Iron & Railroad Co. —
Texas Creosoting Co. ..... —
Tinnerman Products, Inc. ..... —
Toeppen, Manfred K. 83
Transandean Associates, Inc. 13
Turner Brass Works ..... —
Union Supply & Electric Co. ..... —
Unique Mfg. Co. 83
United States Independent Telephone Association ..... —
U. S. Motors Corp. ..... —
U. S. Rubber Co. ..... —
U. S. Steel Corp. 60
United States Steel Export Co. .... —
Utilities Service Co. ..... —
Vulcan Electric Co. ..... —
War Assets Corp. ..... —
Ward Leonard Electric Co. ..... —
Western Electric Co. 68
Whitney Blake Co. 67
Wilcox Electric Co. ..... —
Williams, Geo. E. 83
York Hoover Corp. 52

"Endurance"

TELEPHONE WIRES

DROP—BRIDLE—INTERIOR DUCT — FIXTURE — TREE AND GROUND WIRE or RUBBER and PLASTIC

DROP WIRE

TWISTED PAIR and PARALLEL in NEOPRENE

Manufactured to exacting specifications, utilizing advanced techniques and modern equipment under positive laboratory control.

Distributed by

KELLOGG SWITCHBOARD AND SUPPLY CO.
Chicago 38, Illinois

GENERAL INSULATED WIRE WORKS, INC.
PROVIDENCE, RHODE ISLAND

Eliminating

GUESSWORK

in ENGINEERING CONSTRUCTION and MAINTENANCE of Outside Telephone Plants

Plus . . .

NEW TOOLS and PROPER METHODS

are offered by

NEALE CONSTRUCTION COMPANY

TOPEKA, KANSAS

Our

YEARS OF EXPERIENCE
IS AT YOUR SERVICE

TELEPHONE ENGINEERING

•

Underground Construction

•

Overhead Construction

•

SHELY Construction Co.

P. O. BOX 1291
LEXINGTON, KENTUCKY

The Right Kind...
of Printing for
Telephone Companies

Subscriber Bills
Designed and printed to
Fit your Problems.

Window Envelopes
That make mailing easy.

Toll Tickets
Delivery when you need
them—on quality paper.

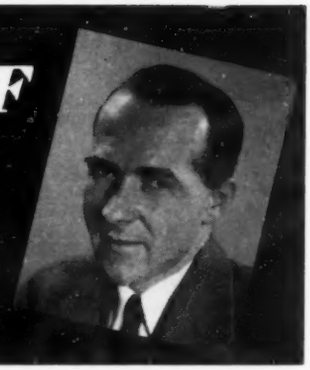
★

Write to Suttle about your special printing problems. See what our special service for Telephone Companies only can do for you!

SUTTLE EQUIPMENT CO.
LAWRENCEVILLE, ILLINOIS

DEPEND ON
SUTTLE

THE BACK OF THE BOOK



By JOHN G. REYNOLDS
Managing Editor

"TAKES MONEY TO MAKE MONEY" . . .

IT HAS BEEN said that it "takes money to make money". This is aptly shown by the fact that one of the large telephone companies finds it has over $15,500 in plant investment per employee. This investment results in a total yearly revenue (1947) of $4,600 per employee. This revenue is distributed 54% ($2500) for wages, benefits, and pensions; 9% ($400.00) goes for taxes; 25% ($1,164) is expended for supplies, rents, etc; 12% ($565) is required for interest and dividends, and (sad to relate) less than ½ of 1% ($31.00) is left to lay away in the company sugar bowl for the rainy day.

• • •

EARLY DAY SUBSCRIBERS . . .

AMONG our prized collection of early day telephone relics we ran across the following letters which by their own words show the great change the art of telephony and public relations has made during the last 50 years.

The first letter was received at the Ann Arbor Exchange of the Michigan State Tel. Company in the early 1900's. It reads:

Mister Keack:—

"Our fone no. 518 11 & 3 short is outa order it axas though its hare spring was catched over the transmitter bobin cause it dont click in your ear when your listnen an there trin to get you to hang up. I wish it could be fixt. I understan in a round a bout way that 2 of our neabors are at outs over a filly an we are somewhat anxus as to how the matter is fixt up. Yours in haste."

The second early day letter was received by New Berlin (N. Y.) Telephone Company about 40 years ago. It states:

Deer Sur:

"i want you to git them dam telfone polds offen my lan or i will chop em down an i heerby notiphy you to get em offen my lan at wunst and if you send enny boddy on my lan to fix enny wires I will prossycewt you to fullxtent of the law for trespis and I giv you notice if them polds aint got offen my lan in reesble time they will be cud down. I also give notis you must move holes also offen my lan."

• • •

FOR THE BENEFIT OF WHAT PEOPLE? . . .

THERE are people (some actually posing as Americans) who tell you how much better off you would be if corporations were not run for profit, but everything were run by the government for the benefit of the people. Let's see.

Here are the facts about your condition under our system of profit, compared to one of the large countries where everything is operated by and for other people.

(1) In America a pair of shoes costs $7. Of that, 35c is profit, $1.75 of it is taxes . . . In Country X a poorer pair of shoes costs $70—10 times as much. Of that, $49 is taxes and $10.50 is profit for the government!

(2) An American workman has to work about 6 hours to earn a pair of shoes. In Country X you would have to work 30 days!

(3) We think we're being imposed on if we have to pay a sales tax of 3% on a loaf of bread. In Country X the people pay a tax of 75% on bread, 62% on soap, 82% on salt and comparable taxes on everything they buy.

(4) In America you can earn your family's food in 3 hours. In Country X you have to work 9 hours for much less and poorer food.

Remember these figures when you hear people rail against corporation profits and praise benevolent governments run "for the benefit of the people."

For the benefit of what people?

HIGHWAY EARTH BORING MACHINE

digs holes better, faster, at lower cost!

When sleet storm fells power and transmission lines, Model HD Highway Earth Boring Machines help restore service in minimum time. Operators say this machine makes it possible to complete new transmission lines in less than half the usual time.

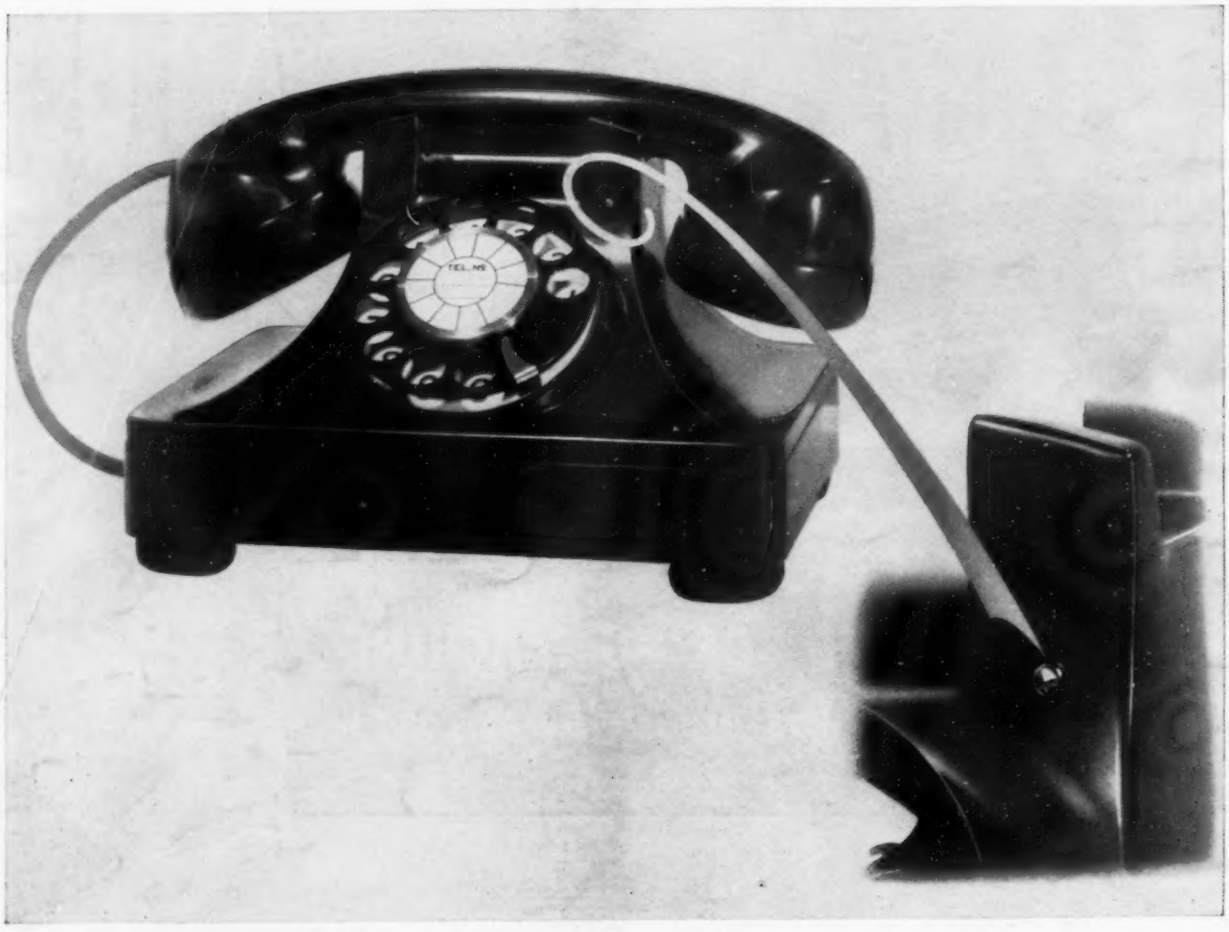
From 60 to 100 holes can be dug and poles can be set in an average working day. Operates in clay, hardpan, shale, or frozen ground. Digs straight or at an angle. Completes 20″ holes 7 feet deep in less than two minutes! Makes it possible for a 2-man crew to dig holes and set 45-foot poles with the same piece of equipment. Mounts in six square feet of space on light tractor or 1½-ton truck.

Other well-known Highway equipment includes line construction and maintenance bodies, pole and cable reel trailers, splicer's trailers, winches and power take-offs. Write today about your immediate needs.

Manufacturers of: Utility Bodies • Winches • Earth Boring Machines
Pole and Cable Reel Trailers and other Public Utility Equipment.
General Offices: **EDGERTON, WISCONSIN, U. S. A.**

HIGHWAY TRAILER COMPANY

North
HOOKSWITCH LATCH
Telephone



For Improved party line service

For many years, the human element of the subscriber has limited the quality of service on party lines having coded ringing. Unfortunately, a ringing telephone has been taken as an invitation to 'listen-in'.

North Hookswitch Latch telephones permit line monitoring without transmission loss. When the handpiece is removed from the cradle, only the receiver is connected to the line, and the service of those actually using the line is not restricted. When the subscriber wishes to dial, the small button on the pedestal is depressed, and the telephone may be used as a standard instrument.

For improved party line service, install the North Hookswitch Latch Telephone.

THE NORTH ELECTRIC MFG. COMPANY
Galion, Ohio